Manual of the Saltbushes (*Atriplex* spp.) in New Mexico

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Abstract

This manual of *Atriplex* species commonly found in New Mexico has been prepared so that both the experienced taxonomist and the non-specialist can identify these plants from detailed drawings and a simplified key.

Acknowledgments

We wish to especially thank Dan Godfrey for the exceptional effort he expended in the preparation of these original illustrations.

ERRATA

The following errors have been noted in General Technical Report RM-57, "Manual of the Saltbushes (*Atriplex* spp.) in New Mexico."

p. 3, Plate 1, "Superior radical" and "Inferior radical" should read "Superior radicle" and "Inferior radicle".

p. 30, Line 1, should read:
"8. *Atriplex elegans* (Moq.) D. Dietr., subsp. *elegans*, Syn. Pl. 5:537, 1852; S. Wats.,".

p. 48, paragraph 5, line 5, should read:
"6,500 feet, Gardner, 9/13/1976 (NMC); Gallup, Highway 66, 6,500 feet, Dennis, 7/16/1966 (NMC); Mexican".

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Manual of the Saltbushes (*Atriplex* spp.) in New Mexico[1]

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[1]*The research reported here is a contribution of the SEAM program. SEAM, an acronym for Surface Environment and Mining, is a Forest Service program to research, develop, and apply technology that will help maintain a quality environment and other surface values while helping meet the Nation's mineral requirements.*

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Contents

Introduction

The genus *Atriplex* has a host of desirable characteristics. The genus includes both annual and perennial species that can tolerate extreme site conditions, are constituents of both early seral and more mature plant communities, are excellent sources of food and cover for domestic livestock and wildlife, and can be planted successfully on badly eroded and/or mine spoil areas.

Species identification for the nonspecialist has been difficult, however, due to phenotypic variations, hybridization, and similar flower, fruit, and vegetative characteristics. To assist both trained and inexperienced field personnel in the identification of *Atriplex* species, several approaches to identification of a specimen are presented.

How to Use the Manual

Most field personnel will find the polyclave (multiple-path) key easiest to use. One can start anywhere in the key, and use the process of elimination to arrive at an identification. Examine the specimen for characteristics used in the key. Evaluation of any character will eliminate some species, so that, after a few characters are examined, only one or two species possibilities will remain. A quick check of the species drawings and New Mexico distribution maps should provide conclusive identification. Both general morphological and vegetative dichotomous keys have also been constructed.

The original illustrations for each species are especially useful in identification. They include a sketch of typical growth form, pistillate and staminate branches for dioecious species or one branch for monoecious species, enlarged views of leaf variation, and dorsal views of the fruiting structures.

Specimens and Literature Examined

Detailed botanical descriptions are based on literature sources cited in the text, and morphological data collected from all material examined. We studied collections from all but northeastern New Mexico. The New Mexico State University (NMC), Arizona State University (ASU), and University of New Mexico (UNM) herbaria holdings were also examined.

Following each description is ecological information that reflects situations encountered in New Mexican populations. Also included are other *Atriplex* species that may be sympatric with the species considered. Distribution maps for the known ranges of the species in New Mexico are based on herbarium material and field observations.

Specimens examined are listed alphabetically by county at the end of this manual.

We have freely consulted and benefited from the major monographs of the genus in North America. S. Watson's work in the Revision of the North American Chenopodiaceae (Proc. Am. Acad. 9:82-126, 1874) was the earliest we consulted. P. C. Standley (N. Am. Fl. 21(1):1-93, 1916) added numerous species to the 40 recognized by Watson. This increase was partly due to Standley's more narrow species concept. More recently, H. M. Hall and F. E. Clements (Carnegie Inst. Wash. No. 326:235-346, 1923) adopted an extremely broad species concept in their monumental account of the genus. They reduced the 103 species recognized by Standley to 47 broadly defined species with numerous subspecies and minor variations. The present study of the New Mexican species largely follows Hall and Clements.

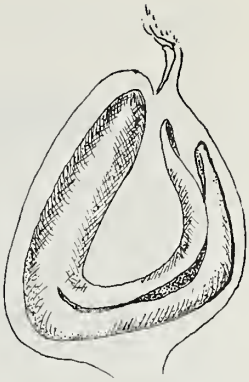
Other revisions covering certain woody members of the genus based on a smaller geographical region were also useful; they include Brown, G. D. (Am. Mid. Nat. 55:201-210, 1956), Hanson, C. A. (M.S. thesis, Brigham Young Univ., 1962) and Reed, C. F., (Flora of Texas (II):52-68, 1969).

Glossary

This is not a complete glossary of all terms appearing in this manual. It does, however, define the words you will need to use the polyclave key. A basic knowledge of common terms used in the identification of plants is assumed, and only less common terms used in the polyclave key are listed here. For a more complete and illustrated glossary see H. D. Harrington and L. W. Durrell's "How to Identify Plants" (1957), Swallow Press.

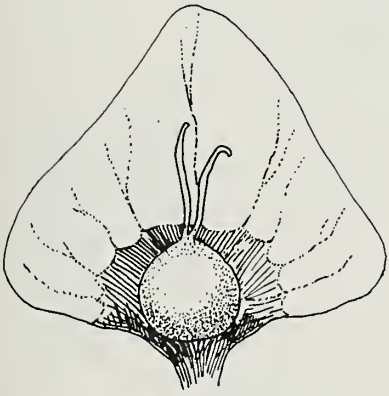
1. Attenuate: gradually narrowing to a base
2. Cleft: cut in, about half way
3. Cordate: heart shaped
4. Cuneate: wedge-shaped
5. Facultative: capable of occurring or not occurring depending on environmental factors
6. Furfuraceous: resembling flakes or grains of bran
7. Glabrate: becoming hairless in age
8. Glomerules: a dense, crowded cluster
9. Hastate: arrow shaped with basal lobes pointing outward
10. Sessile: without a stalk
11. Staminate perianth: floral bracts of male flower (see plate 1)
12. Terete: circular in cross-section
13. Truncate: squared at base
14. Tuberculate: bearing small pimplelike structures

Typical 5-cleft staminate flower

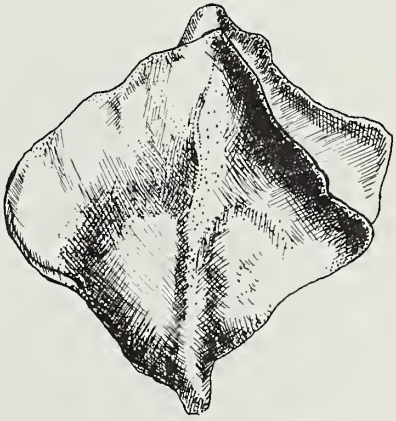


Superior radical

Inferior radical



Fruiting bract (top bract removed to show the pistil)



Fruiting bract (bracts intact)

Plate 1.—Flowers, seed, and fruit characters used in classification.

Checklist of *Atriplex* Species

Polyclave Key

Plants monoecious
A. semibaccata
A. rosea
A. argentea argentea
A. argentea expansa
A. powellii
A. wrightii
A. patula hastata
A. saccaria
A. elegans elegans
A. elegans thornberi
A. corrugata (rarely)
A. canescens (rarely)

Plants dioecious
A. patula hastata (rarely)
A. acanthocarpa
A. obovata
A. cuneata
A. griffithsii
A. confertifolia
A. corrugata
A. canescens
A. powellii (rarely)

Plants annual
A. wrightii
A. rosea
A. saccaria
A. argentea argentea
A. argentea expansa
A. powellii
A. patula hastata
A. elegans elegans
A. elegans thornberi

Plants perennial
A. acanthocarpa (E, SS) [1]
A. corrugata (E, SS)
A. cuneata (E, SS)
A. canescens (FE, S)
A. obovata (FE, SS)
A. semibaccata (CP)
A. confertifolia (FE, S)
A. griffithsii (FE, S)

[1] E= Evergreen, FE= Facultative evergreen, S= Shrub, SS= Subshrub, CP= Crown perennial.

Leaves broadest above the middle
A. semibaccata
A. elegans elegans
A. elegans thornberi
A. wrightii
A. obovata
A. cuneata
A. corrugata
A. confertifolia
A. canescens

Leaves broadest at middle
A. rosea
A. semibaccata
A. obovata
A. cuneata
A. confertifolia
A. canescens

Leaves broadest below the middle
A. patula hastata
A. rosea
A. saccaria
A. argentea argentea
A. argentea expansa
A. powellii
A. acanthocarpa
A. griffithsii
A. confertifolia

Leaves equal width throughout
A. elegans elegans
A. elegans thornberi
A. wrightii
A. cuneata (rarely)
A. corrugata
A. griffithsii
A. canescens

Leaves grayish-furfuraceous
A. rosea
A. saccaria
A. argentea argentea
A. argentea expansa
A. obovata
A. cuneata
A. griffithsii
A. confertifolia
A. canescens

Leaves yellowish-furfuraceous
A. argentea x A. saccaria (see text 4a)
A. obovata
A. cuneata

Leaves whitish-furfuraceous
A. rosea
A. semibaccata
A. saccaria
A. powellii
A. elegans elegans
A. elegans thornberi
A. wrightii
A. acanthocarpa
A. obovata
A. cuneata
A. corrugata

Leaves glabrate
A. patula hastata (light grayish-furfuraceous in youth)

Fruiting bracts distinctly stalked
A. semibaccata
A. saccaria
A. elegans elegans
A. elegans thornberi
A. wrightii
A. acanthocarpa
A. obovata
A. cuneata
A. canescens

Fruiting bracts sessile
A. confertifolia
A. patula hastata
A. canescens
A. rosea
A. semibaccata
A. saccaria (smaller bract type)
A. argentea argentea
A. argentea expansa
A. powellii
A. wrightii
A. obovata
A. cuneata
A. corrugata
A. griffithsii

Seeds pale brown
A. elegans elegans
A. elegans thornberi
A. obovata (reddish)
A. corrugata (reddish)
A. confertifolia (reddish)

Seeds brown
A. saccaria
A. argentea argentea
A. argentea expansa
A. wrightii
A. acanthocarpa
A. cuneata
A. griffithsii
A. canescens

Seeds dark brown
A. rosea
A. semibaccata
A. patula hastata

Seeds black
A. patula hastata
A. semibaccata
A. rosea

Fruiting bracts united only at base
A. patula hastata
A. griffithsii
A. confertifolia (over seed)

Fruiting bracts united to middle
A. rosea
A. semibaccata
A. argentea argentea
A. argentea expansa
A. wrightii
A. obovata

Fruiting bracts united nearly or to apex
A. saccaria
A. powellii
A. elegans elegans
A. elegans thornberi
A. acanthocarpa
A. cuneata
A. corrugata
A. canescens

Radicle superior
A. griffithsii
A. saccaria
A. confertifolia
A. argentea argentea
A. argentea expansa
A. powellii
A. elegans elegans
A. elegans thornberi
A. wrightii
A. acanthocarpa
A. obovata
A. cuneata
A. corrugata
A. canescens

Radicle lateral
A. rosea
A. semibaccata

Radicle inferior
A. patula hastata

Staminate inflorescences of axillary glomerules or terminal leafy glomerules
A. elegans elegans
A. elegans thornberi
A. patula hastata
A. argentea argentea
A. argentea expansa
A. rosea
A. semibaccata
A. saccaria
A. powellii

Staminate inflorescences of terminal spikes or spikelike glomerules
A. patula hastata
A. rosea
A. argentea argentea
A. argentea expansa
A. cuneata (dark brown flowers)
A. corrugata (light brown or yellow flowers)
A. confertifolia

Staminate inflorescences of panicles
A. saccaria
A. wrightii
A. griffithsii
A. acanthocarpa
A. obovata
A. canescens

Pistillate inflorescences of axillary glomerules
A. patula hastata
A. rosea
A. semibaccata
A. saccaria
A. argentea argentea
A. argentea expansa
A. powellii
A. elegans elegans
A. elegans thornberi
A. wrightii

Pistillate inflorescences of terminal spikes or spikelike panicles
A. patula hastata
A. cuneata
A. corrugata
A. confertifolia
A. canescens

Pistillate inflorescences of panicles of spikes
A. acanthocarpa
A. obovata
A. griffithsii
A. canescens

Fruiting bracts smooth faces
A. semibaccata
A. saccaria (smaller bract types)
A. argentea argentea (rarely)
A. argentea expansa
A. powellii (rarely)
A. elegans elegans
A. wrightii
A. obovata
A. griffithsii
A. confertifolia

Fruiting bracts tuberculate
A. canescens (wings)
A. patula hastata
A. rosea
A. saccaria (larger bract types)
A. argentea argentea
A. argentea expansa (rarely)
A. powellii
A. elegans thornberi
A. wrightii (rarely)
A. acanthocarpa
A. obovata (rarely and inconspicuous)
A. cuneata
A. corrugata

Leaf bases cuneate
A. confertifolia
A. griffithsii
A. corrugata
A. rosea
A. semibaccata
A. canescens
A. argentea argentea
A. argentea expansa (rarely)
A. powellii
A. wrightii
A. elegans elegans
A. elegans thornberi
A. acanthocarpa
A. obovata
A. cuneata

Leaf bases attenuate
A. semibaccata
A. wrightii
A. elegans elegans
A. elegans thornberi

Leaf bases truncate or cordate
A. griffithsii
A. saccaria
A. argentea argentea
A. argentea expansa

Leaf bases hastate or subhastate
A. patula hastata
A. argentea expansa (sub)
A. acanthocarpa (sub)
A. argentea argentea (rarely) (sub)

Stems angled
A. acanthocarpa (obtusely)
A. wrightii (obtusely)
A. patula hastata (obtusely)
A. griffithsii (acutely)
A. saccaria (acutely)
A. argentea argentea (acutely)
A. argentea expansa (acutely)
A. powellii (obtusely)
A. elegans elegans (obtusely)
A. elegans thornberi (obtusely)

Stems terete
A. rosea
A. semibaccata
A. obovata
A. cuneata
A. corrugata
A. confertifolia
A. canescens

Lower leaf margins entire
A. griffithsii
A. acanthocarpa (rarely)
A. saccaria
A. obovata
A. argentea argentea
A. argentea expansa (rarely)
A. confertifolia
A. corrugata
A. canescens
A. powellii
A. elegans elegans
A. elegans thornberi
A. wrightii (rarely)
A. cuneata

Lower leaf margins variously toothed
A. argentea argentea
A. argentea expansa
A. patula hastata
A. acanthocarpa
A. rosea
A. semibaccata
A. elegans elegans
A. elegans thornberi
A. wrightii
A. cuneata (rarely)
A. griffithsii (rarely)

Lower leaves opposite
A. argentea argentea
A. argentea expansa
A. obovata
A. cuneata
A. acanthocarpa
A. rosea
A. patula hastata

Lower leaves all alternate
A. obovata
A. argentea expansa
A. rosea
A. powellii
A. elegans elegans
A. elegans thornberi
A. wrightii
A. acanthocarpa
A. cuneata (rarely)
A. griffithsii
A. confertifolia
A. canescens
A. semibaccata

Leaves mostly opposite
A. corrugata

Staminate perianth 4-cleft
A. patula hastata

Staminate perianth 4- or 5-cleft
A. powellii
A. elegans elegans
A. elegans thornberi
A. griffithsii
A. canescens
A. rosea
A. semibaccata
A. argentea argentea

Staminate perianth 5-cleft
A. argentea expansa
A. wrightii
A. acanthocarpa
A. obovata
A. cuneata
A. corrugata
A. confertifolia

Found in northeast quadrant of N. Mex.
A. rosea
A. argentea argentea
A. canescens

Found in southwest quadrant of N. Mex.
A. semibaccata
A. elegans elegans
A. elegans thornberi
A. wrightii
A. acanthocarpa
A. obovata
A. griffithsii
A. canescens

Found in central N. Mex.
A. argentea argentea
A. argentea expansa
A. powellii
A. obovata
A. confertifolia
A. canescens
A. patula hastata

Found in northwest quadrant of N. Mex.
A. patula hastata
A. rosea
A. saccaria
A. argentea argentea
A. powellii
A. obovata
A. cuneata
A. corrugata
A. confertifolia
A. canescens

Found in southeast quadrant of N. Mex.
A. rosea
A. semibaccata
A. argentea expansa
A. elegans elegans
A. acanthocarpa
A. canescens

General Key

1. Plants annual or crown perennial, stems never woody above the caudex, commonly monoecious (subdioecious in *A. powellii* and occasionally dioecious in *A. patula* subsp. *hastata*) ..... 2.

1. Plants, subshrubs or shrubs, stems woody at least near the base, commonly dioecious (rarely monoecious in *A. corrugata* and *A. canescens*) ..... 13.

2(1). Plants perennial from a woody caudex; stems prostrate, forming spreading mats, terete; leaves elliptic-oblong to slightly spatulate, irregularly and remotely repand-dentate; fruiting bracts succulent and reddish at maturity, the faces smooth; seeds dark brown or black (southern) ..... 3. *A. semibaccata*.

2. Plants annual, old basal portions of stems sometimes woody in appearance; stems erect or if decumbent not forming spreading mats, commonly angled; leaves various; fruiting bracts never succulent or reddish at maturity, commonly ligneous, the faces smooth to tuberculate; seeds brown to greenish (except dark brown to black in *A. rosea* and *A. patula* subsp. *hastata*) ..... 3.

3(2). Leaves strongly 3-nerved from the base, the lateral nerves elongate, ascending, blades, entire, thick and firm, ovate to rhombic-ovate, densely whitish-furfuraceous at least beneath; plants subdioecious, some plants pistillate others chiefly staminate with scattered pistillate flowers in leaf axils (northwestern to central) ..... 7. *A. powellii*.

3. Leaves not strongly 3-nerved from the base or if so then the lateral nerves short and spreading or the margins dentate, blades not thick and firm, shape and pubescence various; plants monoecious or if dioecious, then the leaves triangular-hastate ..... 4.

4(3). Leaves strongly triangular-hastate, commonly becoming glabrate and green on both surfaces, lower leaves opposite; stems decumbent or procumbent; flowers in naked, terminal spikelike panicles and axillary glomerules, both staminate and pistillate flowers mixed in the same glomerule; staminate flowers 4-cleft; fruiting bracts rounded-deltoid, the faces short-tuberculate, united only at the base; seeds black; radicle inferior (moist alkaline soils, scattered) ..... 1. *A. patula* subsp. *hastata*.

4. Leaves not triangular-hastate, sometimes subhastate, usually remaining furfuraceous on at least the lower surface, lower leaves alternate or opposite; stems erect; flowers not in naked terminal spikelike panicles or if so, then these with staminate flowers superior to the pistillate or the inflorescence entirely staminate; staminate flowers 4- or 5-cleft; fruiting bracts not rounded-deltoid or if so, then the faces with flat or cristate tubercles, united to at least the middle; seeds not black; radicle lateral or superior ..... 5.

5(4). Leaves mostly cordate, deltoid-ovate, lance-ovate, or rhombic-ovate, broadest below the middle, cordate to broadly cuneate at the base, at least 3-nerved, the lateral nerves sometimes obscure ..... 6.

5. Leaves oblong to elliptic-spatulate or obovate, broadest at or above the middle, cuneate or attenuate at the base, strongly 1-nerved ..... 11.

6(5). Fruiting bracts (often those on the same plant, or even the same axil) distinctly dimorphic, the smaller type cuneate with an herbaceous, denticulate apex and mostly smooth faces, the larger rounded-triangular with numerous flat or cristate appendages on the faces and margins; leaf margins mostly entire (northwestern) ..... 7.

6. Fruiting bracts never distinctly dimorphic, variously shaped, with appendaged or smooth faces; leaf margins entire to repand-dentate ..... 8.

7(6). Leaves cordate-ovate to subreniform-cordate or sometimes broadly truncate at the base, thick and moist to the touch when fresh, whitish-furfuraceous, alternate; staminate flowers in open terminal panicles and axillary glomerules, never in terminal spikes or spikelike panicles ..... 4. *A. saccaria*.

7. Leaves ovate to deltoid-ovate, cuneate at the base, never thick and moist to the touch when fresh, yellowish-furfuraceous, alternate or the lower sometimes opposite; staminate flowers never in open terminal panicles, usually only in axillary glomerules, rarely in terminal spikes or spikelike panicles ..... 4A. *A. saccaria* x *A. argentea* subsp. *argentea*.

8(6). Stems terete; fruiting bracts distinctly 3-nerved, becoming strongly indurate in age; leaves rhombic-ovate, ovate, or oval, acutely and conspicuously sinuate-dentate, rarely subentire, sparsely grayish- or whitish-furfuraceous, sometimes paler beneath; seeds dark brown, radicle lateral (scattered, but widespread) . . . . . 2. *A. rosea*

8. Stems acutely angled; fruiting bracts not distinctly 3-nerved, not becoming strongly indurate in age; leaves deltoid, deltoid-ovate, ovate, or lance-ovate, entire to irregularly dentate, often densely grayish-, whitish-, or yellowish-furfuraceous; seeds brown, radicle superior . . . . . 9.

9(8). Upper leaves sessile or clasping, commonly subhastate or truncate at the base, sparsely furfuraceous; fruiting bracts with herbaceous, dentate margins, the faces smooth or with a few green irregular tubercles (Rio Grande Valley, central to southern) . . . . . 6. *A. argentea* subsp. *expansa*.

9. Upper leaves short-petioled, never clasping, cuneate at the base, densely furfuraceous; fruiting bracts with or without herbaceous margins, subentire to lacinate or appendaged, the faces smooth to densely appendaged (northern to central) . . . . . 10.

10(9). Stems and leaves grayish- or whitish-furfuraceous (northern and central) . . . . . 5. *A. argentea* subsp. *argentea*.

10. Stems and leaves yellowish-furfuraceous (northwestern) . . . . . 4. *A. saccaria* x *A. argentea* subsp. *argentea*.

11(5). Staminate flowers in conspicuous naked or nearly naked terminal panicles 5-30 cm long; plants usually over 3 dm tall, sparsely branched or simple; leaves distinctly bicolored, densely whitish-furfuraceous beneath, green and glabrate above (southwestern) . . . . . 10. *A. wrightii*.

11. Staminate flowers in few-flowered axillary glomerules mixed with the pistillate flowers at least below; plants usually less than 3 dm tall, much-branched from the base; leaves not distinctly bicolored, whitish-furfuraceous on both surfaces but usually paler above . . . . . 12.

12(11). Fruiting bracts orbicular, the margins laciniate-dentate to the base, the terminal tooth sometimes larger, the faces smooth (southern) . . . . . 9. *A. elegans* subsp. *elegans*.

12. Fruiting bracts cuneate-orbicular, cuneate to truncate at the base, the margins irregularly laciniate, the terminal tooth larger, the faces with two prominent lacerate appendages near the base (southwestern) . . . . . 10. *A. elegans* subsp. *thornberi*.

13(1). Fruiting bracts conspicuously 4-winged, never prominently tuberculate; plants shrubs, usually over 5 dm tall; leaves entire, spatulate, oblong, linear or rarely elliptic (widespread) . . . . . 17. *A. canescens*.

13. Fruiting bracts not conspicuously 4-winged, smooth or tuberculate; plants shrubs or subshrubs, usually less than 5 dm tall; leaves variously shaped . . . . . 14.

14(13). Stems slender, acutely angled, strongly striate; leaves elliptic-ovate or oblong, 1-nerved; flowers in more or less interrupted, terminal, flexuous panicles, the panicle branches persistent after flowering; fruiting bracts cordate-reniform (alkaline playas, southwestern) . . . . . 15. *A. griffithsii*.

14. Stems stout, terete or obtusely angled, inconspicuously striate; leaves not elliptic-ovate or oblong or if so, then plants with branches either spinose or stout, 1- to 3-nerved; flowers not in terminal, flexuous panicles; fruiting bracts not cordate-reniform . . . . . 15.

15(14). Stems becoming spinose; plants woody throughout, very compact and rigidly branched; fruiting bracts united only below the middle, orbicular or broadly elliptic, the faces smooth, the margins entire to denticulate, rarely undulate (northwestern and central) . . . . . 16. *A. confertifolia*.

15. Stems not becoming spinose; plants woody only below the middle, not compact and rigidly branched; fruiting bracts united to at least the middle, never orbicular or broadly elliptic or if so, then the margins sharply dentate or the faces tuberculate . . . . . 16.

16(15). Leaves commonly sinuate-dentate, usually subhastate; fruiting bracts on pedicels 2-20 mm long, the bracts 8-14 mm long, the faces with long hornlike tubercles, the tubercles usually over 3 mm long; foliage densely whitish-furfuraceous (southern) . . . . . 11. *A. acanthocarpa*.

16. Leaves entire, never subhastate; fruiting bracts on pedicels less than 2 mm long or sessile, the bracts 3-7 mm long, the faces smooth or tuberculate, the tubercles less than 3 mm long; foliage whitish-, grayish-, or yellowish-furfuraceous .... 17.

17(16). Staminate flowers in small glomerules along spikelike branches of terminal, nearly naked panicles; fruiting bracts broader than long, the faces usually smooth; stems ultimately strictly and rigidly erect, forming roundish subshrubs; leaves obovate to broadly elliptic (northwestern, central, and southern) ..... 12. *A. obovata.*

17. Staminate flowers in large dense glomerules in sparsely leafy or naked spikelike panicles or spikes; fruiting bracts longer than broad, the faces tuberculate at least at the base; stems erect or ascending, not strict or rigid, forming large mounds or mats; leaves linear or spatulate to broadly elliptic (northwestern) ..... 18.

18(17). Staminate flowers dark brown or reddish-brown, in sparsely leafy spikelike panicles; pistillate flowers in terminal spikes or spikelike panicles, these sparsely leafy below; fruiting bracts globoid, the faces with numerous flattened (rarely subterete) or crest-like tubercles up to 3 mm long; upper leaves alternate, broadly elliptic to spatulate or oblong, 0.6 cm wide or more ..... 13. *A. cuneata.*

18. Staminate flowers light brown to yellow, in nearly naked terminal spikes; pistillate flowers in elongate, naked terminal spikes; fruiting bracts panduriform, oblong-ovate, or ovate, the faces with thick wart-like tubercles less than 2 mm long; upper leaves usually opposite or sometimes alternate, broadly linear or linear-spatulate, commonly 0.3 cm (rarely to 0.5 cm) wide ..... 14. *A. corrugata.*

Vegetative Key

1. Plants annual or perennial, deciduous; stems never woody above the caudex . 2.

1. Plants perennial, evergreen or facultative evergreen, stems woody, shrubs or subshrubs ..... 11.

2(1). Plants perennial from a woody caudex; stems prostrate, terete, forming spreading mats; leaves elliptic-oblong to slightly spatulate, short-petioled, irregularly and remotely repand-dentate (southern New Mexico) ..... 3. *A. semibaccata.*

2. Plants annual herbs, old basal portions of stems sometimes slightly woody in appearance; stems mostly all erect; leaves various ..... 3.

3(2). Leaves cordate-ovate or reniform, entire, cordate or rarely broadly truncate at base, thick and moist to the touch when fresh, thin and brittle when dry, whitish-furfuraceous, alternate (northwestern) ..... 4. *A. saccaria.*

3. Leaves never cordate-ovate or if so then other characters not as above, toothed or entire, not thick and moist nor thin and brittle when dry, grayish-, whitish-, or yellowish-furfuraceous, alternate or the lowest opposite ..... 4.

4(3). Stems terete; leaves alternate or the lowest subopposite, ovate to rhombic-ovate or oval, sinuate-dentate, or rarely subentire, grayish- or whitish-furfuraceous on both surfaces, slightly paler beneath, not crowded (widespread) .. 2. *A. rosea.*

4. Stems angled; leaves various but never with the above combinations of characters ..... 5.

5(4). Leaves strongly 3-nerved from the base with long, ascending, lateral nerves, entire, thick and firm, ovate to rhombic-ovate densely furfuraceous beneath (northwestern to central) ..... 7. *A. powellii.*

5. Leaves not strongly 3-nerved from the base or if so then the lateral nerves short or spreading or else the margins dentate, not thick and firm, variously furfuraceous ..... 6.

6(5). Stems decumbent or procumbent; leaves triangular-hastate, commonly becoming glabrate and green on both surfaces at maturity; lower leaves opposite (moist alkaline soils, scattered) ..... 1. *A. patula* subsp. *hastata*.

6. Stems erect; leaves not hastate, (rarely subhastate in *A. argentea*) remaining scurfy and whitish, grayish or yellowish at least on the lower surface at maturity; lower leaves alternate or opposite ..... 7.

7(6). Leaves oblong to elliptic-spatulate or obovate, usually broadest at or above the middle, cuneate or attenuate at the base, sinuate-dentate or rarely entire, lower surface lighter than the upper, strongly 1-nerved (southern) ..... 8.

7. Leaves ovate, deltoid-ovate to lance-ovate, usually broadest below the middle, broadly cuneate to truncate or rarely slightly cordate at the base, entire to toothed, lower surface similar in color to the upper surface, sometimes upper surface lighter, 1- 3- or 5-nerved ..... 9.

8(7). Plants usually over 3 dm tall, sparsely branched or unbranched ..... 10. *A. wrightii*.

8. Plants usually less than 3 (rarely to 6) dm tall, much-branched from the base ..... 8. *A. elegans*.

9(7). Upper leaves sessile or clasping, usually subhastate or truncate at the base, sparsely furfuraceous (Rio Grande Valley, south-central to southern) ..... 6. *A. argentea* subsp. *expansa*.

9. Upper leaves short petioled, never clasping, cuneate at the base, densely furfuraceous ..... 10.

10(9). Stems and leaves grayish- or whitish-furfuraceous (northern and central) ..... 5. *A. argentea* subsp. *argentea*.

10. Stems and leaves yellowish-furfuraceous (northwestern) ..... 4. *A. saccaria* x *A. argentea* subsp. *argentea*.

11(1). Stems acutely angled with prominent striae, slender, flexuous, much branched; leaves elliptic-ovate or oblong, 1-nerved (alkaline playas, southwestern New Mexico) ..... 15. *A. griffithsii*.

11. Stems terete or obtusely angled with striae inconspicuous, stout, simple to much branched; leaves not elliptic-ovate or oblong or if so, then plants with spinose or stout branches, 1- to 3-nerved ..... 12.

12(11). Leaves mostly opposite, broadly linear or linear-spatulate, commonly 0.3 - 0.5 cm wide or less; plants forming densely leafy mats 1-2 dm high; stems sometimes rooting at the nodes (extreme northwestern) ... 14. *A. corrugata*.

12. Leaves mostly alternate, only lower leaves opposite or subopposite, usually not linear or linear-spatulate, often over 0.6 cm wide; plants not forming spreading mats or if so, then (*A. cuneata*) leaves elliptic to spatulate or oblong and stems not rooting at the nodes ..... 13.

13(12). Stems becoming spinose; plants woody throughout, very compact and rigidly branched (northwestern and central) ..... 16. *A. confertifolia*.

13. Stems not becoming spinose; plants sometimes woody throughout, loosely to densely branched but not compact and rigidly branched ..... 14.

14(13). Leaves usually sinuate-dentate, oblong to oblong-lanceolate or ovate, broadest mostly below the middle, usually subhastate, thick, densely whitish-furfuraceous; subshrub (southern) ..... 11. *A. acanthocarpa*.

14. Leaves never sinuate-dentate (rarely dentate in *A. cuneata*), obovate, elliptic, spatulate, or oblong, rarely linear, broadest mostly at or above the middle, never subhastate, grayish-, whitish-, or yellowish-furfuraceous; subshrubs or shrubs ..... 15.

15(14). Plants woody throughout, usually over 5 dm tall, forming variously shaped plants; leaves spatulate, oblong, linear, or rarely elliptic (widespread) ..... 17. *A. canescens*.

15. Plants woody only at base, usually less than 5 dm tall, forming roundish or spreading plants with erect stems; leaves obovate or broadly elliptic, rarely spatulate or oblong ..... 16.

16(15). Stems strictly and rigidly erect from decumbent bases, forming roundish subshrubs, never large mounds or mats; leaves obovate to broadly elliptic (northwestern, central, and southern) ..... 12. *A. obovata*.

16. Stems erect to ascending, but not strict or rigid, from spreading decumbent bases, forming large mounds or mats; leaves broadly elliptic to spatulate or oblong (northwestern) ..... 13. *A. cuneata*.

Systematic Treatment

Atriplex L., Sp. Pl. 1052, 1753; S. Wats., Proc. Am. Acad. 9:103, 1874; Hall and Clements, Carnegie Inst. Wash. No. 326:244, 1923; Brown, Am. Midl. Nat. 55:201, 1956; Reed, Flora of Texas (II):52, 1969.

Obione Gaertn., Fruct. 2:198, 1791.
Holimus Wallr., Sched. Crit. 117, 1822.
Pterochiton Torr. in Frem., Rept. Calif. 318, 1845.
Schizotheca C. Meyer ex. Lindl., Veg. Kingd. 513 (hyponym), 1847, not *Schizotheca* Ehrenb., 1832.
Phyllotheca Nutt. ex Moq. in DC., Prodr. 13(2):98 (Prosyn.), 1849.
Lophocoryo Nutt. ex Moq. in DC., Prodr. 13(2):106, (Prosyn.), 1849.
Pterocoryo Nutt. ex Moq. in DC., Prodr. 13(2):106 (Prosyn.), 1849, not *Pterocoryo* Kunth, 1824.
Phyllocorpo Nutt. ex Moq. in DC., Prodr. 13(2):108 (Prosyn.), not *Phyllocorpus* Riedel, 1842.
Theleophyton Moq. in DC., Prodr. 13(2):115, 1849.
Armolo Kirschl. ex Montand., Syn. Fl. Jura. Sept. 261, 1856.
Teutliopsis Celak., Oesterr. Bot. Zeits. 22:168, 1872.

Summer annuals, subshrubs, or shrubs, the woody forms either deciduous or evergreen, more or less pubescent with scurflike hairs; leaves alternate or the lower opposite, rarely all opposite, sessile or petioled, entire to dentate, serrate, or irregularly and deeply toothed; plants dioecious or monoecious, flowers solitary or in glomerules, the single or clustered flowers in leaf-axils and/or in terminal spikes or panicles, the staminate and pistillate flowers mixed in the same cluster or the staminate superior or terminal to the pistillate axillary glomerules; staminate flowers ebracteate, perianth 3- to 5-cleft, segments obovate or oblong and obtuse; stamens 3 to 5, inserted on the base of the perianth, filaments either united at the base or distinct, anthers 2-celled, rudiment of ovary conical or wanting; pistillate flowers each subtended by 2 accrescent bracts enclosing the fruit, distinct or united, fleshy, spongy or ligneous, margins entire, dentate, laciniate or appendaged, the faces smooth to variously appendaged, perianth wanting or rarely of a 3- to 5-lobed membranous calyx or of 1 to 5 squamellae; stamens wanting; ovary ovoid or depressed-globose; stigmas 2, nearly filiform, sometimes slightly thickened or compressed near the connate bases; ovule oblique or erect and with a short funicle, or inverted and suspended from the end of an elongated funicle; utricle with the pericarp membranaceous and usually free from the seed; seed erect or inverted, rarely horizontal, the coat membranaceous, coriaceous, or subcrustaceous; embryo annular, surrounding the farinaceous endosperm, the radicle inferior, lateral, or superior. The genus consists of about 200 species, mostly in temperate and subtropical regions. Represented in New Mexico by 17 taxa including one naturalized species, *Atriplex semibaccata* R. Br. Type species *Atriplex hortensis* L.

1. *Atriplex patula* L. subsp. *hastata* (L.) H. & C., Carnegie Inst. Wash. No. 326:249, 1923; Type from Europe.

Atriplex hastata L., Sp. Pl. 1053, 1753; Standl., N. Am. Fl. 21(1):42, 1916.
Atriplex halimus Pursh, Fl. Am. Sept. 199, 1814, not *A. halimus* L., 1753.
Atriplex laciniata Pursh, Fl. Am. Sept. 199, 1814, not *A. laciniata* L., 1753.
Atriplex hollmoides Raf., Am. Monthly Mag. 2:176, 1818.
Atriplex mucronato Raf., Am. Manthly Mag. 2:176, 1818.
Atriplex diaica Raf., Am. Monthly Mag. 2:176, 1818.
Chenopadium subspicatum Nutt., Gen. Am. 1:199, 1818.
Atriplex laciniata var. *americana* Torr., Fl. U.S. 1:293, 1824.
Atriplex purshiano Moq., Chen. Enum. 55, 1840.
Atriplex tetrandra Torr. ex Moq. in DC., Prodr. 13(2):93, 1849.
Atriplex grocilis Moq. in DC., Prodr. 13(2):95, 1849.
Chenapodium hastatum (L.) Dumant., Bull. Soc. Bot. Belg. 4:339, 1865.
Atriplex patulo var. *hastato* (L.) A., Gray, Man. Bot. Ed. 5:409, 1867; Fern., Gray's Man. Bot. ed. 8:597, 1950; Reed, Flora Texas (II):54, 1969.
Teutliopsis hastata (L.) Celak., Oesterr. Bot. Zeits. 22:168, 1872.
Atriplex potulo var. *subspicata* S. Wats., Proc. Am. Acad. 9:107, 1874.
Atriplex lapathifolia Rydb., Mem. N.Y. Bot. Gard. 1:133, 1900.
Atriplex cornosa A. Nels., Bot. Gaz. 34:261, 1902.
Atriplex subspicoto (S. Wats.) Rydb., Bull. Torr. Club 33:137, 1906.

Halberd-leaved saltbush

Annual herb; stems erect, decumbent or procumbent, 3-9 dm long, usually much branched, branches ascending or spreading, obtusely angled, sparsely or densely furfuraceous when young, often glabrate, green or stramineous in age; leaves opposite below, the others alternate, petioles of the lower leaves up to half as long as the blades, upper leaves very short-petioled, the blades of the lower leaves broadly triangular, hastate or ovate-hastate, 2.5-7 cm long and nearly as broad, acute or obtuse at the apex, truncate at the base or with a rounded sinus, the margins entire or more often sinuate-dentate or shallowly repand-dentate, the basal lobes acute, upper leaf-blades hastate-oblong to lanceolate, smaller, mostly entire margined, acute at the apex, truncate or broadly cuneate at the base, all the leaf blades thin or succulent, densely furfuraceous, bright green in age; plants monoecious or sometimes dioecious; flowers in slender or stout, dense or interrupted, naked, simple or broadly paniculate spikes and usually also in axilliary fascicles, both staminate and pistillate flowers usually in the same small glomerules; staminate perianth usually 4-cleft; pistillate wanting, fruiting bracts sessile, rounded-deltoid or ovate-deltoid, 3-7 mm long, herbaceous, united only at the truncate or rounded base, often reddish in age, acute or acutish, denticulate or rarely entire on the margins, usually short-tuberculate on the sides, densely furfuraceous or glabrate; seed 1.5-2.5 mm long, nearly black, the radicle inferior, Newfoundland to South Carolina, Ohio, Indiana, Illinois, Missouri, west to British Columbia and California, and south to Texas; Europe, Asia, and North Africa; flowering from June to October. A very sporadic halophytic annual in New Mexico; presently known only from moist, alkaline soils of Socorro and San Juan Counties. It may occur with other *Atriplex* species.

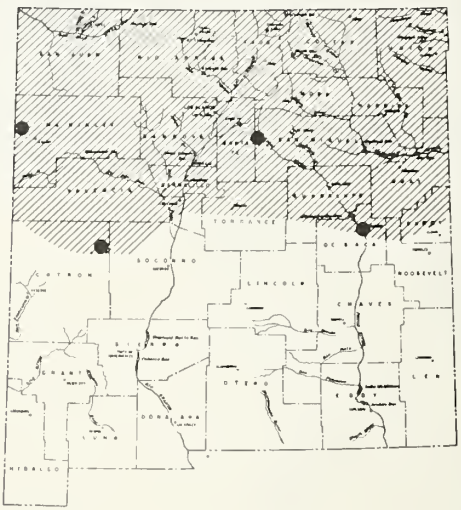
I. *A. patula*, subsp. *hastata*

2. *Atriplex rosea* L., Sp. Pl. ed. 2:1493, 1753; S. Wats., Proc. Am. Acad. 9:108, 1874; Standl., N. Am. Fl. 21(1):43, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:259; Reed, Flora of Texas (II):55, 1969. Type from southern Europe.

Atriplex alba Scop., Delic. Insub. 2:116, 1787, not *A. alba* Crantz, 1766.
Teutliopsis rosea (L.) Celak., Oesterr. Bot. Zeits. 22:169, 1872.
Atriplex spatiosa A. Nels., Bot. Gaz. 34:360, 1902.

Red orache saltbush

Erect summer annual herb; stems 2-10 dm tall, much branched, or simple at the base, ascending or widely spreading, terete, stramineous or whitish, coarsely furfuraceous or glabrate; leaves alternate, rarely the lowest subopposite, on petioles one-third as long as the blades or sessile, upper leaves sessile, blades ovate, rhombic-ovate, or oval, 2-8 cm long, 1-5 cm wide, obtuse or acute, mucronulate, broadly cuneate or rounded at the base, sinuate-dentate or repand-dentate with acute or obtuse teeth, thinly to densely furfuraceous, grayish to whitish, rarely greenish, soft but persistent, the upper leaves reduced, entire or subhastate; plants monoecious, staminate flowers few to many, in glomerules in the upper axils, often also in dense terminal spikes 1 cm long or less, the pistillate flowers in glomerules below the staminate, intermediate glomerules usually both staminate and pistillate; staminate perianth deeply 4- or 5-cleft, pistillate wanting; fruiting bracts sessile, compressed, united to about the middle, rhombic to cuneate-orbicular, 4-5 mm (12 mm) long, acute, dentate on the margins, short tuberculate on the sides, 3-nerved, becoming strongly indurated in age; seeds orbicular, 2-2.5 mm in diameter, dark brown, dull; radicle lateral; Wyoming to southern Washington, south to southern California and Chihuahua, appearing native; adventive New York to Florida; Europe, western Asia, northern Africa and Australia; flowering from July to September. Very sporadic in New Mexico at roadsides, cultivated fields or waste places, as a seral species in moderately alkaline soils. It is rarely an abundant species in any locale observed in New Mexico. *A. rosea* occasionally grows with *A. argentea* subsp. *argentea*, *A. canescens*, *A. obovata*, *A. powellii*, or *A. saccaria*.



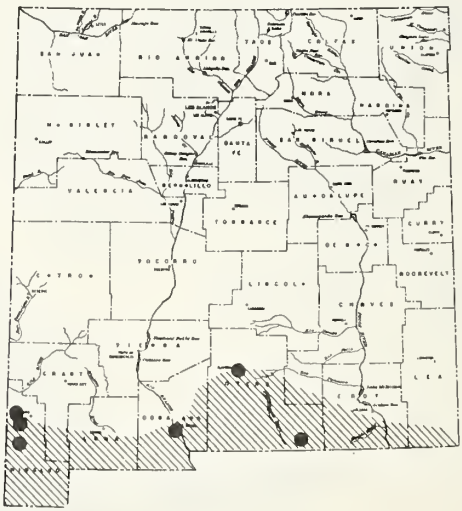
2. *A. rosea*

3. *Atriplex semibaccata* R. Br., Prodr. 406, 1810; Standl., N. Am. Fl. 21(1):52, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:262, 1923; Reed, Flora of Texas (II):59, 1969. Type from vicinity of Port Jackson, Australia.

Atriplex denticulata Moq. in DC., Prodr. 13(2):97, 1849.
Atriplex flagellaris Woot. & Standl., Contr. U.S. Nat. Herb. 16:119, 1913.

Australian saltbush

Prostrate crown perennial from an elongated taproot, forming spreading mats; stems prostrate, diffusely spreading from the base, 6-15 dm long, much branched, branches wiry, terete, sparsely furfuraceous in youth, later glabrate and then stramineous, the bark rough only on old basal portions; leaves alternate, numerous, short petioled, blades elliptic, elliptic-oblong, or spatulate, 1-3.5 cm long, 2-9 mm wide, obtuse or acute, cuneate to attenuate at the base, irregularly and remotely repand-dentate or the upper entire, thin, densely and finely white-furfuraceous beneath, sparsely furfuraceous to glabrate and green on the upper surface, strongly 1-nerved; plants monoecious, staminate flowers in small terminal leafy-bracted glomerules or mixed with the pistillate, pistillate flowers solitary or in few-flowered clusters in the axils of nearly all but the upper leaves; staminate perianth either 4- or 5-cleft, pistillate wanting; fruiting bracts sessile or short stalked, reddish, convex and slightly succulent when fresh but compressed when dry, rhombic, 3-6 mm long, 3-5 mm wide, acute, cuneate at base, united to about the middle, margins denticulate to entire, faces smooth, strongly (when dry) 3- or 5-nerved; seeds either black or dark brown, 1.5-2 mm long, grooved near the margin; radicle lateral, from Australia; introduced as a forage plant in California, now established from western Texas to southern New Mexico, southern Arizona, and California; flowering from June to September. Scattered to locally abundant, playas, roadsides, and waste places as a seral species in moderately alkaline soils. This species is an effective soil binder because of its spreading mat habit.
A. semibaccata acts as a native and is often found with *A. acanthocarpa* and *A. griffithsii* in or around the margins of playas, *A. canescens*, *A. elegans*, or *A. wrightii* in less alkaline situations.



3. *A. semibaccata*

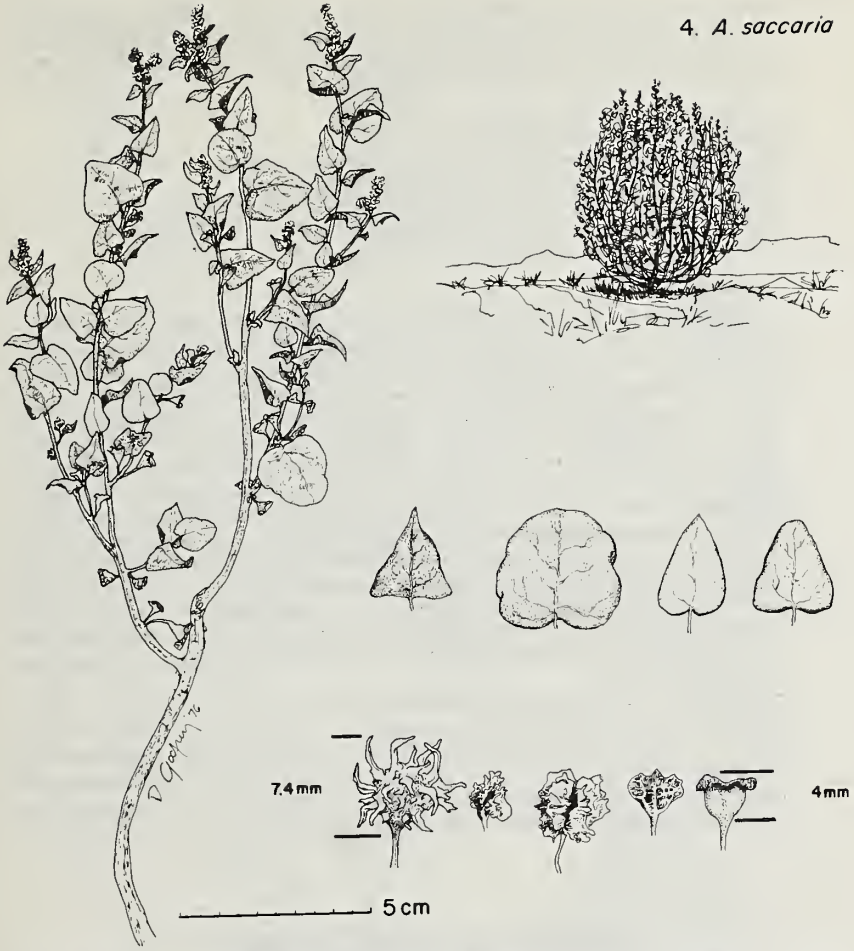
4. *Atriplex saccaria* S. Wats., Proc. Am. Acad. 9:112, 1874; Standl., N. Am. Fl. 21(1):45, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:280, 1923; Reed, Flora of Texas (II):57, 1969. Type from desert plains of southern Wyoming or northern Utah.

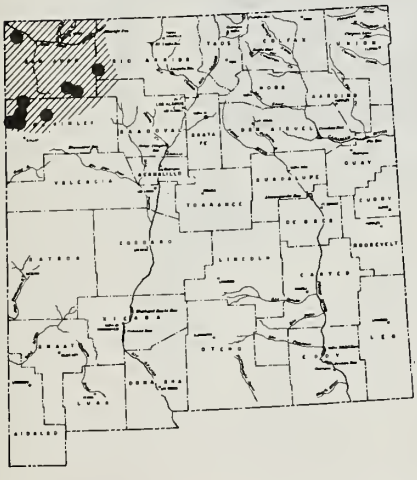
Atriplex cornuta Jones, Proc. Calif. Acad. (II) 5:718, 1895.
Atriplex truncata var. *saccorio* Jones, Contr. West. Bot. 11:20, 1903.
Atriplex argenteo var. *cornuta* Jones, Contr. West. Bot. 11:21, 1903.
Atriplex truncata var. cornuta Reed, Flora of Texas (II): 57, 1969 (as a synonym, apparently an oversight for *A. orgentea* var. *cornuto* Jones).
Atriplex exponsa var. *cornuta* Standl., N. Am. Fl. 21(1):45, 1916 (as a synonym, apparently an oversight for *A. argenteo* var. *cornuta* Jones).

Twoscale
Erect summer annual herb; stems 1-5 dm high, much branched throughout to form a dense globoid plant, stout, angled, roughly whitish-furfuraceous, glabrate in age, the bark white and cracking in age; leaves mostly alternate, 1-3 cm long, 1-2.5 cm wide, petiolate, the petioles 1-5 mm long, the upper leaves occasionally subsessile, blades broadly cordate-ovate to subreniform, cordate to broadly truncate at the base, acute at the apex, entire, thick and moist to the touch when fresh, drying thin, grayish to whitish with a dense rough scurf; plants monoecious, staminate flowers in glomerules in the upper axils and in open terminal panicles, these usually deciduous on mature plants, pistillate flowers in few-flowered axillary clusters; perianth of the staminate flowers 5-cleft, pistillate wanting; fruiting bracts sparsely compressed, united to the apex, of two kinds, the larger bracts on pedicels 4-6 mm long, rounded-triangular or orbicular, 4-6 mm long, irregularly beset with flat, cristate, or sometimes hornlike appendages, the smaller bracts short stalked or sessile, 3 mm long, cuneate at base, truncate at apex, denticulate and sometimes slightly undulate at apex, faces smooth, densely scurfy, the veins not prominent; seeds brown, 1.8-2.3 mm long; radicle superior; southwestern Wyoming to eastern Utah and Nevada, south to northwestern New Mexico and northeastern Arizona; flowering from June to September. Jones 5841 is listed in Hall and Clements (1923) as collected at El Paso, Texas, far out of the normal range of this species. No recent collections of *A. saccaria* have been seen from this Texas locality or from any surrounding areas.
Common on badlands, roadsides and along arroyos, as a dominant on badlands or as a seral species in the other situations. It is often found growing in heavy clay soils without associated species. *A. saccaria* when it occurs in less harsh situations is commonly associated with *A. argentea* subsp. *argentea*, *A. powellii*, *A. confertifolia*, *A. canescens* or *A. obovata*.

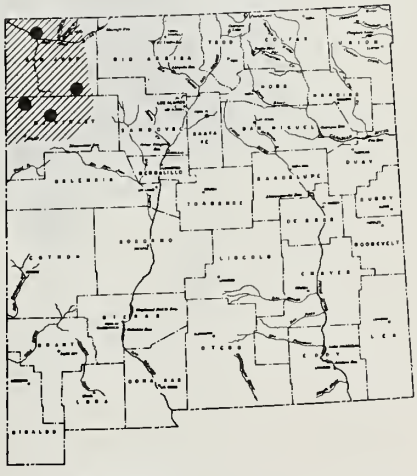
4A. Several specimens from northwestern New Mexico exhibit morphological characters of both *A. saccaria* and *A. argentea* subsp. *argentea*. The plants have the characteristic heteromorphic fruiting structures of *A. saccaria* but cuneate leaf bases like *A. argentea*. These data suggest the possibility of hybridization between the two species which are sympatric in all areas where the aberrant specimens have been taken. These specimens may also represent a distinctive taxon. Support for this hypothesis is shown in the vestiture of the specimens which is more or less densely yellowish-furfuraceous, unlike either putative parent or any other annual *Atriplex* of northwestern New Mexico. Except for the heteromorphic fruiting bracts on the specimens examined, the aberrent specimens fit the combination of morphological characters established for *A. caput-medusae* Eastw. (Proc. Calif. Acad. II. 6:316, 1869; Standl., N. Am. Fl. 21(1):48, 1916) which was described by Standley as occurring throughout the Four Corners region. Further lab and field study is needed to determine whether or not these specimens are hybrids of *A. saccaria* and *A. argentea*, *A. caput-medusae* Eastw. or an as yet undescribed taxon. In this paper these specimens are referred to as *A. argentea* x *A. saccaria*.

4. *A. saccaria*





A. saccaria



A. saccaria
x A. argentea subsp. *argentea*

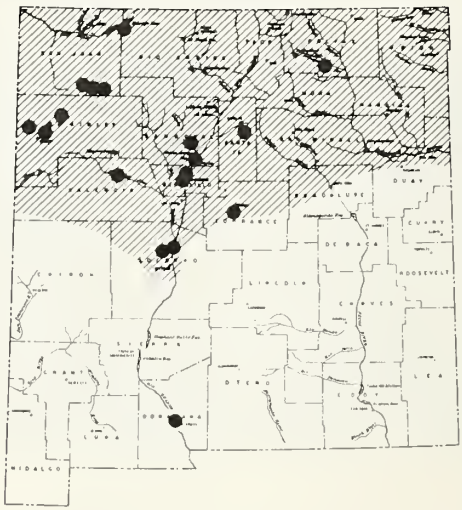
5. *Atriplex argentea* Nutt. subsp. *argentea*, Gen. Am. 1:198, 1818; S. Wats., Proc. Am. Acad. 9:115, 1874; Standl., N. Am. Fl. 21(1):46, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:282, 1923; Reed, Flora of Texas (II):58, 1969. Type from sterile saline places near the Missouri River.

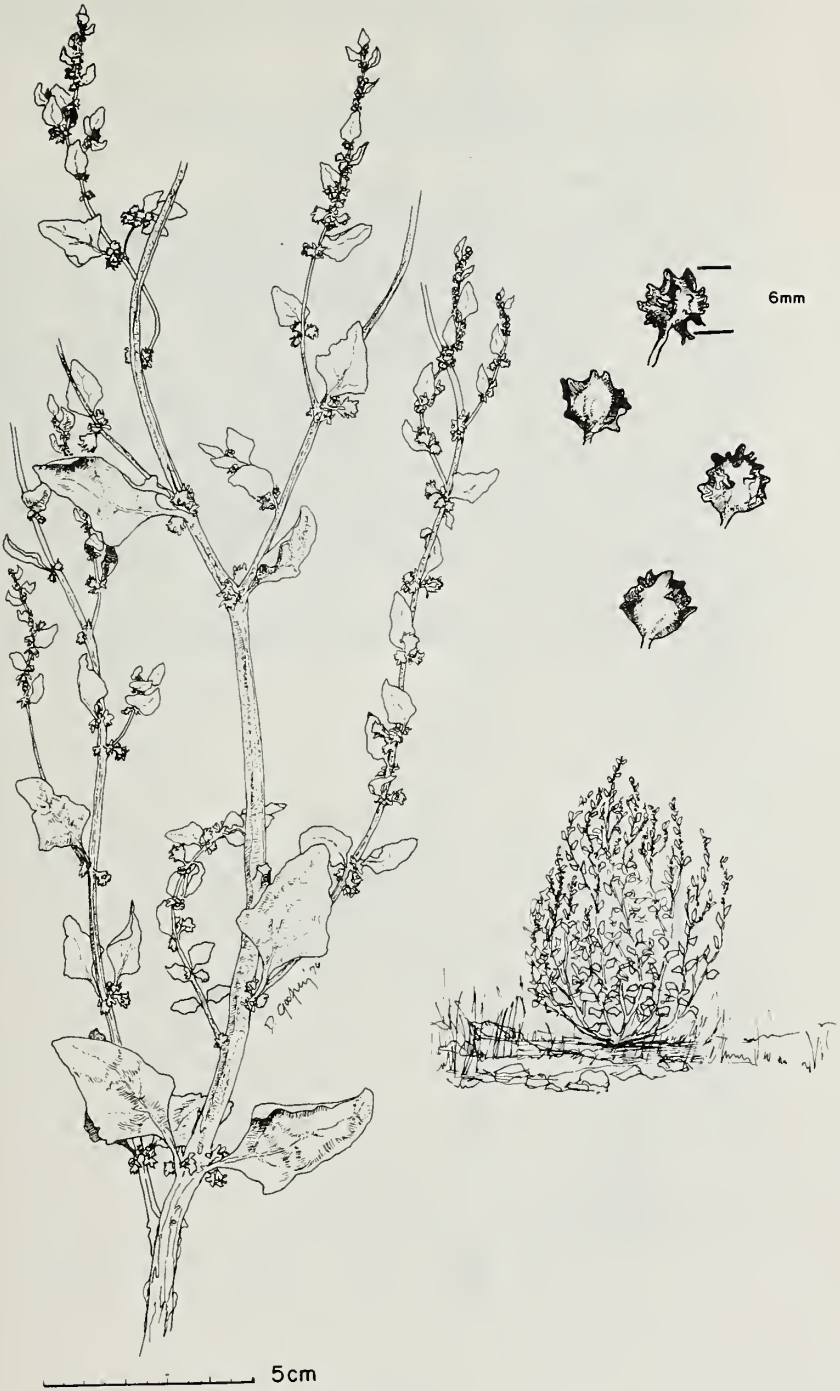
Obione argentea (Nutt.) Moq., Chen. Enum. 76, 1840.
Atriplex nodosa Greene, Pittonia 1:40, 1887.
Atriplex caput-medusae Eastw., Proc. Calif. Acad. 2(6):316, 1896; Standl., N. Am. Fl. 21(1):48, 1916.
Atriplex valutans A. Nels., Bull. Torr. Bot. Club 25:203, 1898.
Atriplex argentea var. *caput-medusae* (Eastw.) Fosberg, Am. Midl. Nat. 26:693, 1941.
Atriplex argentea var. *hillmani* Jones, Contr. West. Bot. 11:21, 1903.
Atriplex rydbergii Standl., N. Am. Fl. 21(1):47, 1916.
Atriplex hillmani (Jones) Standl., N. Am. Fl. 21(1):48, 1916.

Silverscale saltbush

Erect summer annual herb, 1.5-8 dm tall, freely branched from the base forming a globoid plant, rarely more strict or with fewer branches; stems stout, angled, furfuraceous when young, the bark becoming whitish and exfoliating in age; leaves opposite below, alternate above, all at least short petioled, deltoid-ovoid to rounded-ovate, 2-5 cm long, 1-4 cm wide, cuneate to subhastate at the base, obtuse or rarely acute at the apex, entire or irregularly dentate, slightly thick, gray-furfuraceous, glabrate; plants monoecious, staminate and pistillate flowers mixing in both axillary glomerules and terminal interrupted spikes, sometime the staminate flowers in pure clusters in terminal spikes; staminate perianth 4- or 5-cleft, pistillate wanting; fruiting bracts sessile or subsessile, compressed, united at least to the middle, obovate or cuneate-orbicular, 4-8 mm long, 4-10 mm wide including the green herbaceous margins, subentire to laciniate, the faces smooth to variously appendaged; seeds brown, 1.5 mm long; radicle superior; southern Saskatchewan to North Dakota, northern New Mexico and California; also western Texas; introduced in the midwestern and eastern United States; flowering from July to September.

Scattered to locally common in alkaline usually clay soils, either in mature halophytic communities or as a seral species. It may occur with *A. rosea*, *A. saccaria*, *A. powellii*, *A. obovata*, *A. canescens*, or *A. confertifolia*. Abberant forms which are apparent hybrids are discussed under *A. saccaria*. These forms could possibly be *A. caput-medusae*, presently listed as a synonym of *A. argentea* subsp. *argentea* but upon further study these forms may prove to be specifically distinct.





5. *A. argentea*, subsp. *argentea*

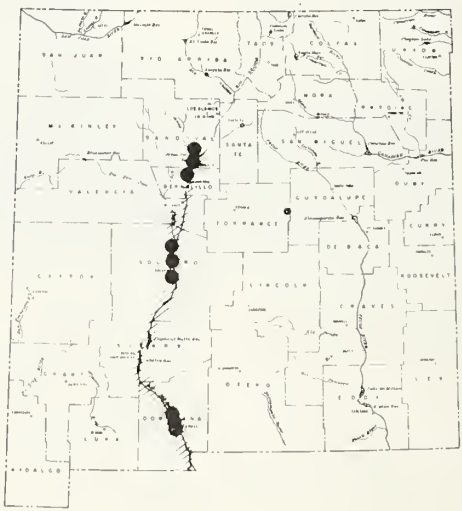
6. *Atriplex argentea* Nutt. subsp. *expansa* (S. Wats.) H. & C., Carnegie Inst. Wash. No. 326:284, 1923; Reed, Flora of Texas (II): 59, 1969. Type from the bottoms of the Rio Grande, western Texas.

Obione orgentea Torr., U.S. & Mex. Bound. Bot. 182, 1859, not *O. orgentea* Moq., 1840.
Atriplex exponso S. Wats., Proc. Am. Acad. 9:116, 1874; Standl., N. Am. Fl. 21(1):47, 1916.
Atriplex exponso var. *mohavensis* Jones. Contr. West. Bot. 11:20. 1903.
Atriplex mohovensis (Jones) Standl., N. Am. Fl. 21(1):47, 1916.

Spreading saltbush

Erect summer annual herb, 3-12 dm tall, much branched from the base, rarely with fewer branches; stems stout, sharply angled, sparsely furfuraceous when young, glabrate and stramineous in age; leaves alternate, the lower opposite or alternate, petioled, the petioles equalling the blades or shorter, the upper closely sessile or clasping, commonly erect, broadly cordate-ovate or deltoid to lance-ovate, often subhastate or rarely tapering to the petiole, obtuse at the apex, irregularly and sharply dentate or entire, 2.5-7.5 cm long, 2-6 cm wide, sparsely furfuraceous; plants monoecious, staminate and pistillate flowers mixing in axillary glomerules or in naked terminal spikes which tend to be mostly staminate; staminate perianth 5-cleft, pistillate wanting; fruiting bracts sessile or subsessile, united to above the middle, obovate or cuneate-orbicular, 5-7 mm long, 2-4 mm wide including the herbaceous dentate margins, the faces smooth or with a few green irregular tubercles; seeds brown 2.0 mm long; radicle superior; western Texas to California and northern Mexico; flowering from June to September or October. Scattered in valleys usually in alkaline soils, sands or clays, sometimes as a seral species. It may occur with *A. patula* subsp. *hastata*, *A. semibaccata*, *A. elegans*, *A. wrightii*, or *A. canescens*.

Further investigations in the field and lab, especially breeding and cytotaxonomic studies may prove this taxon a full species status rather than only subspecific rank.



6. *A. argentea*, subsp. *expansa*

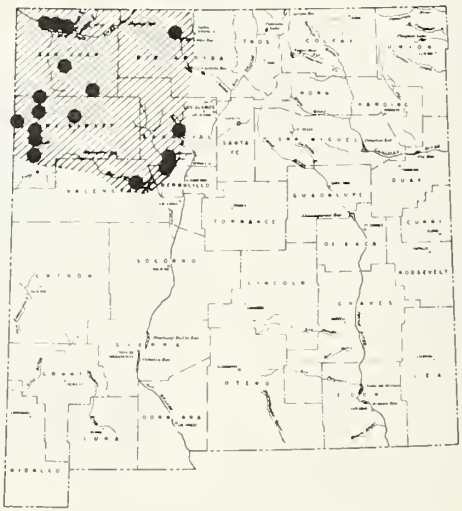
7. *Atriplex powellii* S. Wats., Proc. Am. Acad. 9:114, 1874; Standl., N. Am. Fl. 21(1):48, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:290, 1923. Type from Arizona.

Atriplex philonitro A. Nels., Bot. Gaz. 34:358, 1902.
Atriplex nelsoni Jones, Contr. West. Bot. 11:21, 1903.

Ribscale

Strictly erect summer annual herb; stems 1-10 dm tall, simple to sparingly branched from the base forming a pyramidal or columnar plant, ascending or erect, somewhat woody and brittle in age, obtusely angled, white-furfuraceous, the old bark exfoliating in patches; leaves alternate, petiolate, upper ones subsessile or sessile, petioles nearly as long as the blades, blades broadly ovate or rhombic-ovate, rounded or abruptly cuneate at the base, acute at apex, 1-3.5 cm long, 0.8-3 cm wide, entire, thick and firm, not fleshy, densely white-furfuraceous especially on lower surface, prominently 3-nerved from the base; plants imperfectly dioecious, some plants purely pistillate, others chiefly staminate but with scattered pistillate flowers in the lower axils, and some plants with pistillate flowers below the staminate, flowers all in axillary glomerules exceeded by subtending leaves; staminate perianth 4- or 5-cleft, pistillate wanting; fruiting bracts sessile, thick, united to apex, broadly spatulate to oblong, 3-4 mm long, the faces with prominate thickened ascending processes or these rarely wanting, the apex margined with a truncate green lobe; seeds 2 mm long, greenish-yellow; radicle superior; Alberta to eastern Colorado, northwestern New Mexico, northeastern Arizona, and Utah; flowering from July to September.

Common to locally abundant in alkaline clay or sometimes sandy soils, often acting as a seral species. It often occurs with *A. saccaria*, *A. argentea* subsp. *argentea*, *A. obovata*, *A. canescens*, *A. corrugata*, *A. cuneata*, or *A. rosea*.



7. *A. powellii*

8. *Atriplex elegans* (Moq.) D. Dietr., [subsp. *elegans*], Syn. Pl. 5:537, 1852; S. Wats., Proc. Am. Acad. 9:114 1874; Standl., N. Am. Fl. 21(1):58. 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:300, 1923; Reed, Flora of Texas (II):56, 1969. Type from Sonora, Mexico.

Obiane elegans Maq. in DC., Prodr. 13:113, 1849.
Obiane radiata Torr., U.S. & Mex. Bound. Bot. 183, 1859.
Obiane elegans var. *radiata* Torr., U.S. & Mex. Bound. Bot. 183, 1859, (partim).

Whitescale saltbush

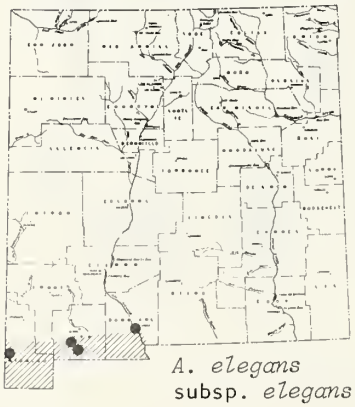
Erect summer annual herb; stems 1-6 dm tall, much branched from the base, obtusely angled, ascending (rarely procument), coarsely furfuraceous when young, glabrate and then stramineous in age; leaves alternate, sessile or short petioled, oblong to obovate or elliptic-spatulate, cuneate to attenuate at the base, obtuse at the apex, 0.5-4.5 cm long, 0.2 to 0.9 cm wide, entire or irregularly and remotely short-dentate, thin, white-furfuraceous on both surfaces but generally lighter above, only the midvein prominent; plants monoecious, flowers in few-flowered axillary glomerules, lower glomerules usually purely pistillate, the upper mixed or rarely staminate near the apex; perianth of staminate flowers 4- or 5-cleft, pistillate wanting; fruiting bracts short pediceled, strongly compressed, united throughout except the herbaceous margins, orbicular, 0.2-0.4 cm in diameter, margins laciniate-dentate usually to the base, the terminal tooth occasionally larger, the faces flat and unappendaged, the midvein prominent, glabrate; seeds pale brown or whitish; radicle superior; western Texas to southern California, south to Durango, Mexico; flowering after early summer rains through fall, rarely in spring after heavy winter moisture. Sporadic in grasslands, arroyos, or as a seral species when it is usually abundant, generally in moderately alkaline soils. This species does not usually grow with other *Atriplex* species, but may be found occasionally with *A. wrightii*, *A. argentea* subsp. *expansa*, *A. canescens*, or *A. elegans* subsp. *thornberi*.

9. *Atriplex elegans* (Moq.) D. Dietr. subsp. *thornberi* (Jones) W. L. Wagner, comb. nov. Type from Tucson, Arizona.

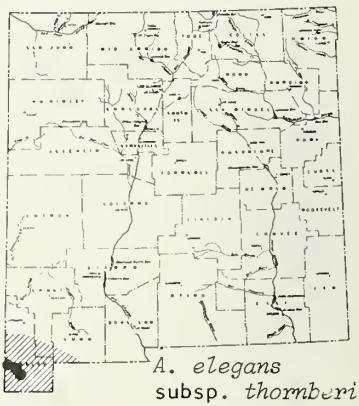
Atriplex elegans var. *thornberi* Jones, Contr. West. Bot. 12:76, 1908.
Atriplex thornberi (Jones) Standl., N. Am. Fl. 21(1):57, 1916.

Thornber wheelscale

Characters as in *A. elegans* subsp. *elegans* except that the fruiting bracts are cuneate-orbicular, cuneate to truncate at the base, the faces with two prominent lacerate appendages near the base, the margins irregularly and deeply laciniate, the terminal tooth occasionally larger; south-central New Mexico to south-central Arizona and northern Mexico; flowering after early summer rains throughout fall. Sporadic in grasslands, arroyos, or as a seral species generally in moderately alkaline soils. This species may grow with *A. elegans* subsp. *elegans*, *A. canescens*, or *A. wrightii*. *A. elegans* subsp. *thornberi* does not appear to intergrade morphologically with *A. elegans* subsp. *elegans*.



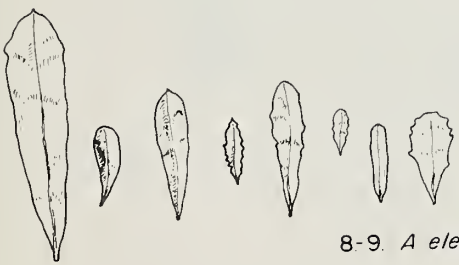
A. elegans subsp. *elegans*



A. elegans subsp. *thornberi*

subsp. *thornberi*

subsp. *elegans*



8-9. *A elegans*

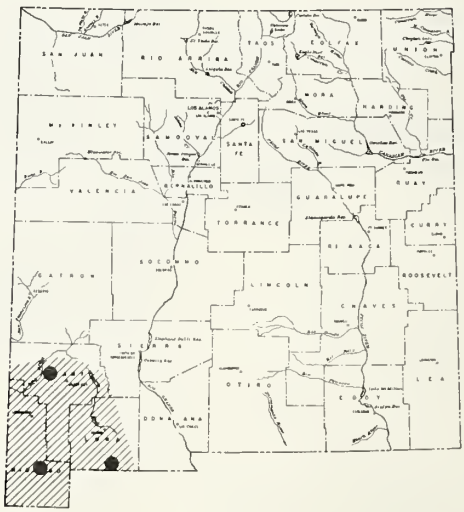
10. *Atriplex wrightii* S. Wats., Proc. Am. Acad. 9:113, 1874; Standl., N. Am. Fl. 21(1):53, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:304, 1923; Reed, Flora of Texas (II):60, 1969. Type from southwestern New Mexico.

Obione elegans var. *radiata* Torr., U.S. & Mex. Baund. Bot. 183, 1859 (partim), not *Obiane radiata* Tarr. *Atriplex radiata* (Tarr.) Cault., Contr. U.S. Nat. Herb., 2:368, 1894.

Wright saltbush

Erect or ascending summer annual herb; stems 2-10 dm tall, simple sparsely branched from the base, the branches stout, obtusely angled, sparsely furfuraceous when young, glabrate and stramineous or reddish in age; leaves alternate, short petioled or sessile, the blades oblong to elliptic-spatulate, 1.5-7.5 cm long, 0.3-2.5 cm wide, obtuse and mucronulate or the upper ones acute at the apex, cuneate to long-attenuate at the base, coarsely sinuate-dentate or repand-dentate, or more rarely entire, thin, densely white-furfuraceous beneath, green and glabrous above at least in age, strongly 1-nerved; plants monoecious, staminate flowers in naked terminal panicles 5-30 cm long, pistillate flowers in nearly all of the leaf-axils in few flowered clusters; staminate perianth 5-cleft, pistillate wanting; fruiting bracts short stalked or sessile, strongly compressed, united to about the middle, cuneate-orbicular or broadly cuneate, 2-3 mm long, 2.5-4 mm broad, the margins conspicuous, greenish, strongly compressed, laciniate-dentate, the faces smooth or rarely obscurely tuberculate; seeds 1.2-1.5 mm long, brown, radicle superior; western Texas, southwestern New Mexico, central Arizona and northern Mexico. Also reported by Reed (1969) from California and Nevada; probably flowering from July to September.

Occasional to common along intermittent streams and arroyos in desert and grassland regions, also acts as a seral species and grows along roadsides, in grazed grasslands and cultivated fields. It usually grows in slightly alkaline soils and may occur with *A. elegans*, *A. canescens*, *A. semibaccata* and possibly *A. argentea* subsp. *expansa*.



10. *A wrightii*

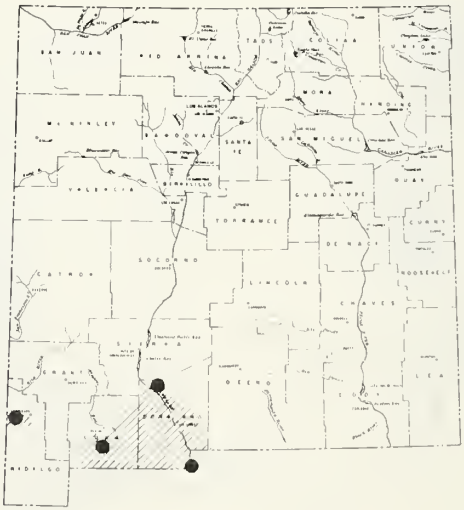
11. *Atriplex acanthocarpa* (Torr.) S. Wats., Proc. Am. Acad. 9:117, 1874; Standl., N. Am. Fl. 21(1):65, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:320, 1923; Reed, Flora of Texas (II):66, 1969. Type from plains between Burro Mountains, New Mexico.

Oblone aconthocarpa Torr., U.S. & Mex. Bound. Bot. 183, 1859.
Atriplex pringlei Standl., N. Am. Fl. 21(1):68. 1916.

Burscale

Erect evergreen subshrub, 2-10 dm tall; stems woody up to the middle or only at the base, freely branching from the base, stout, obtusely angled or nearly terete, densely furfuraceous, staminate plants occasionally less densely furfuraceous, the bark on woody portions exfoliating in age; leaves alternate or the lower opposite, short petioled or subsessile, the blades oblong to oblong-lanceolate or ovate, usually subhastate, 1.5-5 cm long, 0.5-2.5 cm wide, broadly cuneate at base, obtuse at the apex, usually sinuate-dentate, rarely entire, thick, white with a dense scurf; plants dioecious, staminate flowers in dense glomerules in sparsely leafy interrupted paniculate spikes, pistillate flowers in leafy panicles or racemes; staminate perianth 5-cleft, pistillate wanting; fruiting bracts on stalks 2-20 mm long, thick and spongy but hardened in age, united nearly to the linear beaklike apex, subglobose or broadly elliptic, 8-14 mm long, the faces bearing numerous flattened, irregular, hornlike, often toothed tubercles, to 8 mm long; seeds 1.5-2.0 mm long, brown; radicle superior; western Texas to southern Arizona, Chihuahua, and San Luis Potosi; flowering from late June to September.

Occasional to common in alkaline flats and along the margins of playas, rarely on slopes or along arroyos. *A. acanthocarpa* often grows with *A. obovata*, *A. griffithsii* and may also be found with *A. canescens*.



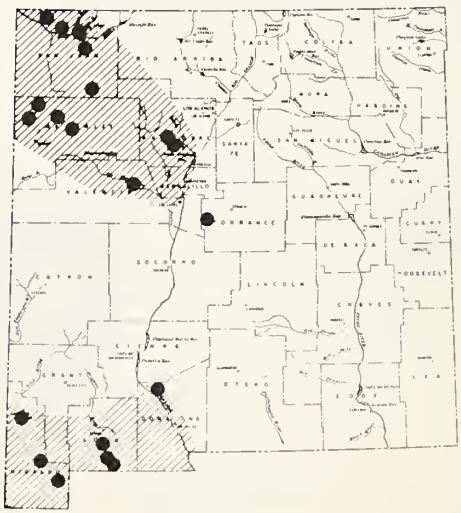
11. *A acanthocarpa*

12. *Atriplex obovata* Moq., Chen. Enum. 6l, 1840; Standl., N. Am. Fl. 21(1):66, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:321, 1923; Reed, Flora of Texas (II):67, 1969. Type from San Luis Potosi, Mexico.

Atriplex greggii S. Wats., Proc. Am. Acad. 9:118, 1874.
Atriplex sabulosa Jones, Contr. West. Bot. 11:21, 1903.
Atriplex jonesii Standl., N. Am. Fl. 21(1):65, 1916.
Atriplex obovoto var. *tuberoto* Macbr., Contr. Gray Herb. 53:11, 1911.

Broadscale

Facultative evergreen subshrub, forming roundish bushes, 2-5 dm high; stems rigidly erect, from decumbent to ascending, much branched, spreading bases, terete, gray-furfuraceous, the bark exfoliating in strips from basal portions; leaves alternate except the lowest sometimes opposite, short petioled, obovate or broadly elliptic, 1-3.5 cm long, 0.5-2 cm wide, obtuse to cuneate at the base, obtuse or rarely retuse at the apex, entire, thick, yellowish to whitish with a dense scurf; plants dioecious, staminate flowers in dense glomerules along the spikelike branches of oblong terminal nearly naked panicles, pistillate flowers in small glomerules in the axils of elongated terminal leafy spikes, rarely in panicles; staminate perianth 5-cleft, pistillate wanting; fruiting bracts short stalked or sessile, compressed or slightly convex, united to the middle, obovate or cuneate-orbicular, 4-5 mm long, 5-7 mm wide, the apex and margins sharply dentate or denticulate, the faces smooth or with scattered small tubercles; seeds 2.4-2.8 mm long, light or reddish brown; radicle superior; known from two disjunct regions, south-central Colorado, central New Mexico, and northwestern Arizona, and western Texas to southeastern Arizona, south to Chihuahua and Zacatecas; flowering from June to October. Occasional on alkaline flats, mesas, and slopes with other halophytic species; sometimes the dominant element of the vegetation on compacted, alkaline clay flats. If not in pure stands *A. obovata* is often found associated with *A. canescens*, *A. corrugata*, *A. cuneata*, *A. acanthocarpa*, *A. argentea* subsp. *argentea*, *A. powellii*, *A. elegans* , or *A. confertifolia*. The northern (*A. jonesii*) and southern (*A. obovata*) forms of *A. obovata* (the northern forms with larger leaves, large bracts, and a more yellowish vestiture) are best treated as one taxon after Hall and Clements (1923). The disjunct distribution, the climatic differences in each portion of the range, and the apparent but overlapping morphological differences do not appear to be sufficient evidence for separation into two taxa without further morpho-geographical and cytotaxonomic analysis.



12. *A. obovata*

13. *Atriplex cuneata* A. Nels., Bot. Gaz. 34:357, 1902. Type from Emery, Utah.

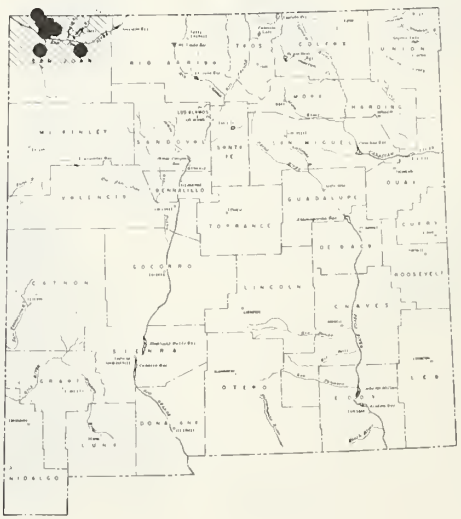
Atriplex acanthocarpa var. *cuneata* (A. Nels.) Jones, Contr. West. Bot. 11:20, 1903.
Atriplex nuttallii S. Wats. subsp. *cuneata* (A. Nels.), H. & C., Carnegie Inst. Wash. No. 326:324, 1923.

Moundscale

Spreading evergreen subshrub, forming large mats 4-18 dm across, 1-5 dm high; stems erect from a decumbent, woody, much branched base, terete, gray- or white-furfuraceous, the bark dark and rough on old basal portions; leaves alternate, except the lower opposite, short petioled, broadly elliptic to spatulate or rarely oblong, obtuse at the apex, cuneate at the base, 1.2-6 cm long, 0.6-2.5 cm wide, entire or sometimes dentate, white, yellow or gray with a dense scurf, thick and firm; plants dioecious, staminate flowers in glomerules in dense, stout, sparsely leafy, spikelike panicles, dark brown or reddish brown, pistillate flowers in few-flowered glomerules in long compact, terminal spikes or spikelike panicles, the panicles leafy below; staminate perianth 5-cleft, pistillate wanting; fruiting bracts sessile or short stalked, indurate, united nearly to the apex, globoid to ovate or oblong usually longer than wide, 5-7 mm long, irregularly dentate or triangular-subulate at the apex, the faces with numerous flattened rarely subterete crestlike tubercles, up to 3 mm long, the tubercles rarely sparse; seeds 2-2.5 mm long, brown; the radicle superior; southwestern Colorado to southeastern Utah, and northwestern New Mexico; flowering from April to May. A codominant species in northwestern New Mexico on Mancos clay mesas and slopes with *A. corrugata*, *A. confertifolia*, *A. obovata*, *Hilaria jamesii* (Torr.) Benth. *Artemisia spinescens* D.C. Eat. and *Frankenia jamesii* Torr. Occasionally it may be associated only with *A. corrugata* but usually is not quite as tolerant of extreme conditions as *A. corrugata*. *A. cuneata* may also grow with *A. saccaria* or *A. powellii* in addition to the *Atriplex* species mentioned above.

A. cuneata is sometimes difficult to distinguish from *A. corrugata*. However, *A. cuneata* is discernable by the broader, mostly alternate leaves, the bracts which are globoid or narrow near the apex (never broader above the middle) and usually with a dense covering of flattened tubercles.

A. neomexicana Standl. (N. Am. Fl. 21(1):67, 1916) was described from northwestern New Mexico. It differs from *A. cuneata* in the larger foliaceous free tips on the fruiting bracts. Hanson (1962) suggests that *A. neomexicana* is merely a hybrid between *A. cuneata* x *A. confertifolia*. *A. neomexicana* is common near Shiprock, New Mexico (H. Stutz, personal communication).



13. *A. cuneata*

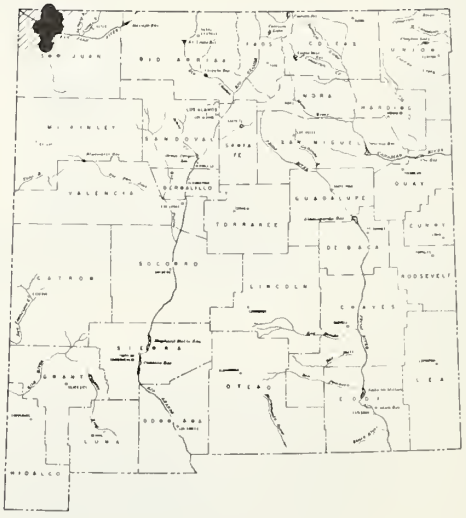
14. *Atriplex corrugata* S. Wats., Bot. Gaz. 16:345, 1891; Standl., N. Am. Fl. 21(1):66, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:330, 1923. Type from Grand Junction, Colorado.

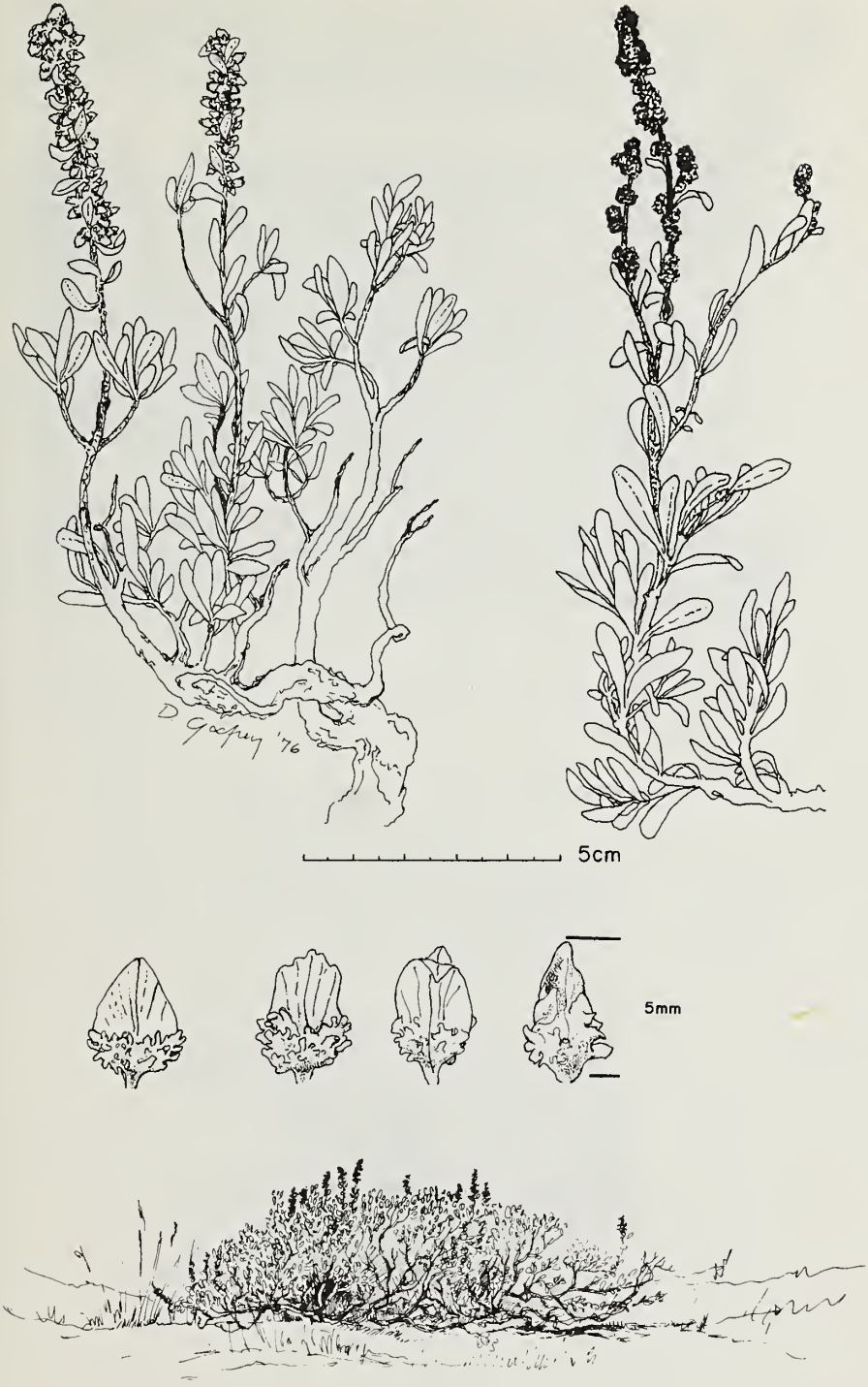
Atriplex nuttallii var. corrugata A. Nels. in Coult. & Nels., Man. Rocky Mt. Bot. 168, 1909.

Matscale

Spreading evergreen subshrub, forming dense leafy mats 1-2 dm high; stems decumbent but the flowering stems strictly erect and slender, rooting at the nodes, terete, densely furfuraceous, the white bark thick and spongy shredding into fibrous sheaths on old parts; leaves mostly opposite, the upper alternate, crowded, sessile, broadly linear or linear-spatulate, cuneate at the base, obtuse at the apex, 0.5-2.0 cm long, 0.2-0.5 cm wide, entire, densely white-scurfy; plants dioecious, rarely monoecious, staminate flowers in large glomerules along nearly naked terminal spikes, yellow to light brown, pistillate flowers in elongated terminal spikes far exceeding the leaves; staminate perianth 5-cleft, pistillate wanting; fruiting bracts sessile, thick, united nearly to apex, panduriform, oblong-ovate to ovate, the terminal free portion broadly obtuse, 4-6 mm long, 3-4 mm wide, the sides with thick wartlike or somewhat flattened tubercles; seeds 2 mm long, reddish-brown; radicle superior; southwestern Colorado to southern Utah and northwestern New Mexico; flowering from April to early June.

A codominant species in northwestern New Mexico on Mancos clay mesas and slopes with *Hilaria jamesii*, *A. cuneata*, *A. confertifolia*, *A. obovata*, *Artemisia spinescens*, and *Frankenia jamesii*. Sometimes *A. corrugata* will occur in pure stands in the extremely alkaline and xeric sites. *A. corrugata* may grow with *A. powellii* or *A. saccaria* in addition to the *Atriplex* species mentioned above. *A. corrugata* is sometimes difficult to distinguish from *A. cuneata*. However, *A. corrugata* is discernable by the narrower opposite leaves and the bracts which are broader above with the free portion developed into a smooth nearly entire liplike appendage. This identification problem is further complicated by occasional hybridization between the two species (Hanson, 1962).





14. *A. corrugata*

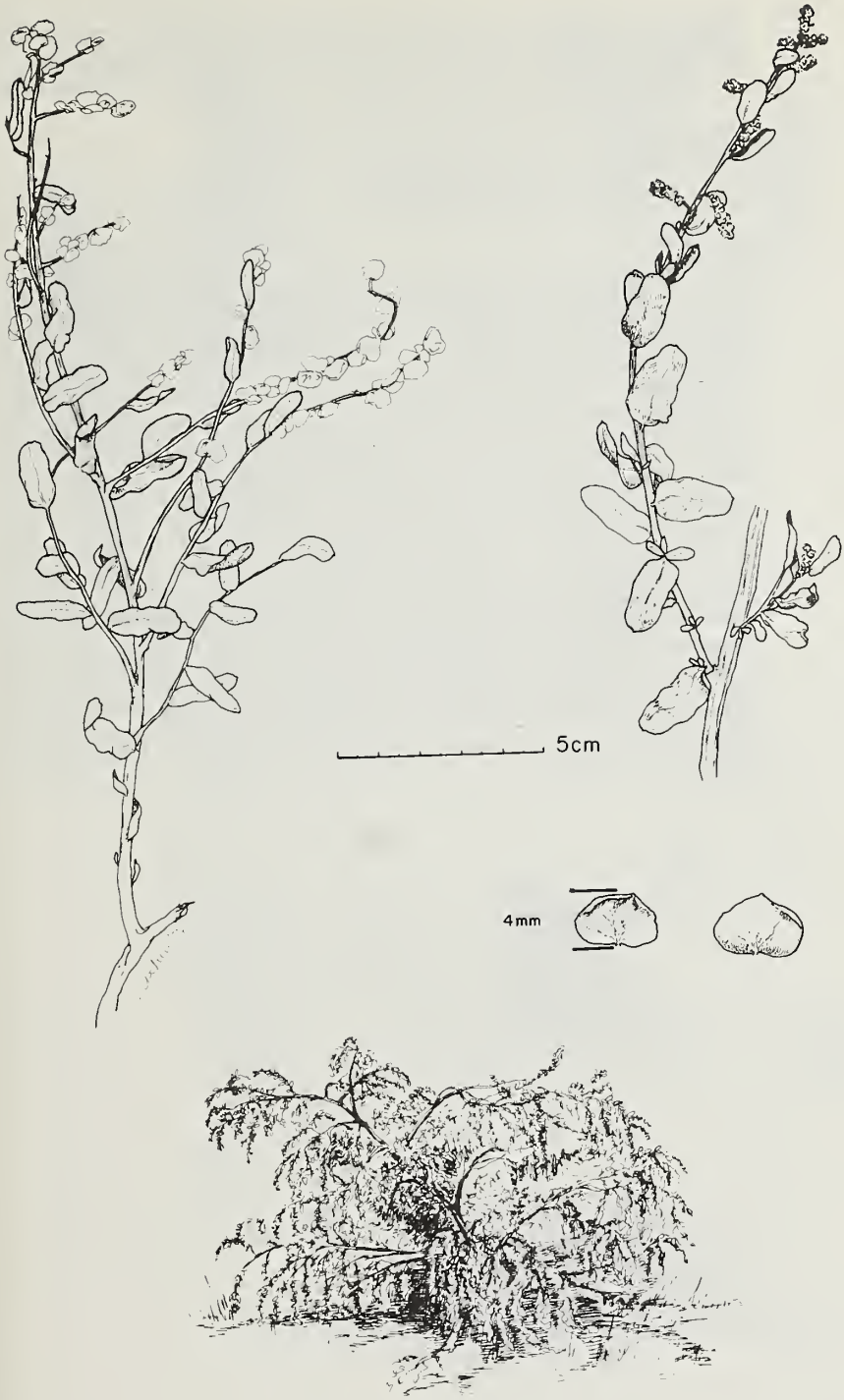
15. *Atriplex griffithsii* Standl., N. Am. Fl. 21(1):63, 1916. Type from Wilcox, Arizona.

Atriplex lentiformis subsp. *griffithsii* (Standl.) H. & C., Carnegie Inst. Wash. No. 326:336, 1923.
Atriplex lentiformis var. *griffithsii* (Standl.) L. Benson, Am. J. Bot. 30:236, 1943.
Atriplex torreyi var. *griffithsii* (Standl.) Brown, Am. Midl. Nat. 55:205, 1956.

Griffith saltbush

Erect, facultative evergreen (?) shrub, woody throughout, 3-10 dm tall, flexuously much branched, usually globoid in outline; stems slender, acutely angled by prominent striae, finely furfuraceous, the bark rough and gray on older stems; leaves alternate, short petioled or sessile, elliptic-ovate to narrowly oblong, 0.9-2 cm long, 0.3-1.2 cm wide, obtuse at the apex, truncate to cuneate at the base, entire or sometimes slightly undulate, thin, grayish with a fine scurf, 1-nerved from the base; plants dioecious, staminate and pistillate flowers in glomerules in more or less interrupted profuse terminal panicles, the fruiting branches sometimes somewhat recurved, staminate perianth 4- or 5-cleft, pistillate wanting; fruiting bracts sessile, cordate-reniform or cordate-orbicular, flat or convex, united at the base, 4-5 mm long, 4-6 mm wide, always broader than long, the margins entire to crenulate, sometimes rolled slightly; seeds 1.5 mm long, brown; radicle superior; known from three disjunct localities, 3 miles east of Deming, New Mexico (may now be extirpated), Lordsburg Playa, New Mexico and Willcox Playa, Arizona; probably flowering mostly in late summer.

A. griffithsii is usually a dominant element of the vegetation in the playas cited above, occurring primarily around the margins and in areas not under water for long periods of time. *A. griffithsii* also acts as a seral species revegetating disturbed areas, but only around playas. It commonly grows with *A. acanthocarpa* and *A. obovata* and rarely with *A. canescens*.



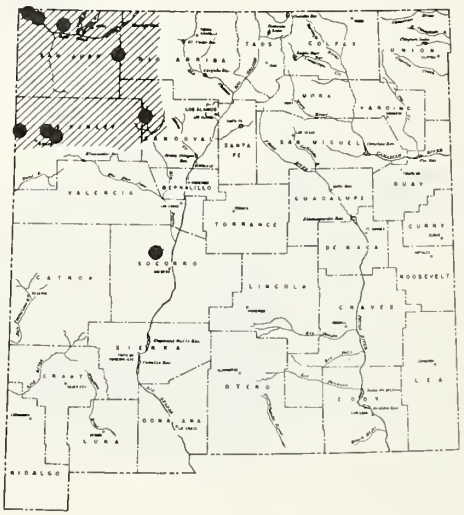
15. *A. griffithsii*

16. *Atriplex confertifolia* (Torr. & Frem.) S. Wats., Proc. Am. Acad. 9:119, 1874; Standl., N. Am. Fl. 21(1):70, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:338, 1923; Brown, Am. Midl. Nat. 55:203, 1956; Reed, Flora of Texas (II):68, 1969. Type from border of Great Salt Lake.

Obiane confertifolia Torr. & Frem. in Frem., Rept. Calif. 318, 1845.
Obiane rigida Torr. & Frem. in Frem., Rept. Calif. 318, 1845 (*nom. nud.*).
Obione spinasa Maq. in DC., Prodr. 13(2):108, 1849.
Atriplex collina Waat. & Standl., Contr. U.S. Nat. Herb. 16:119. 1913; Standl., N. Am. Fl. 21(1):70, 1916.
Atriplex subconferta Rydb., Fl. Racky Mts. 248, 1917.

Shadscale

Erect, facultative evergreen shrub, woody throughout, rigidly branched, very compact, usually forming a rounded bush, 2-8 dm tall; stems stout, terete, erect or ascending, furfuraceous in youth becoming smooth and stramineous, old bark exfoliating and gray, branches and twigs becoming spiny; leaves alternate, crowded, short petioled, ovate, obovate, orbicular-ovate, or elliptic, rounded or cuneate at the base, obtuse at the apex, 1-2.5 cm long, 0.5-1.8 cm wide, entire, firm, gray with a fine scurf, 1- or 3-nerved from the base; plants dioecious, staminate flowers in glomerules in the axils of the upper leaves forming leafy-bracted spikes, pistillate flowers solitary or several in the upper leaf axils, forming dense subpaniculate spikes; staminate perianth 5-cleft, pistillate wanting; fruiting bracts sessile, convex, united over the seed, orbicular or broadly elliptic, 6-12 mm long, 5-10 mm wide, the faces smooth, the margins entire, rarely undulate, denticulate or serrulate; seeds oval, 1-2 mm long, reddish-brown; radicle superior; western North Dakota to Oregon, south to Chihuahua, New Mexico, northern Arizona and California; flowering from March to May. Occasional or sometimes a dominant species on alkaline, usually rocky soils on benches and slopes throughout most of the species range in New Mexico. The widest occurrence of *A. confertifolia* in New Mexico is on the Mancos clay mesas and slopes in San Juan county where it is a codominant with *Hilaria jamesii*, *A. cuneata*, *A. corrugata*, *A. obovata*, *Artemisia spinescens*, and *Frankenia jamesii*. *A. confertifolia* may be found growing with *A. cuneata*, *A. corrugata*, *A. obovata*, *A. canescens*, *A. powellii*, *A. argentea* subsp. *argentea*, or *A. saccaria*.



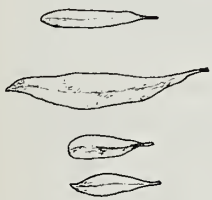
16. *A. confertifolia*

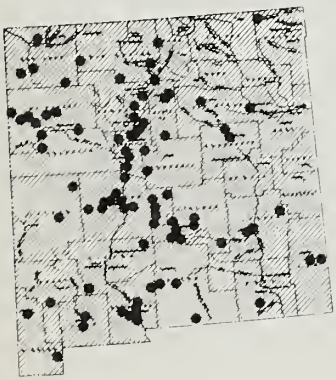
17. *Atriplex canescens* (Pursh) Nutt., Gen. Pl. 1:197, 1818; Standl., N. Am. Fl. 21(1):71, 1916; Hall and Clements, Carnegie Inst. Wash. No. 326:342, 1923; Brown, Am. Midl. Nat. 55:208, 1956; Reed, Flora of Texas (II):63, 1969. Type from plains of Missouri River, near Big Bend, South Dakota.

Calligonum canescens Pursh, Fl. Am. Sept. 370, 1814.
Atriplex beriandieri Moq., Chen. Enum. 65, 1840.
Obione canescens (Pursh) Moq., Chen. Enum. 74, 1840.
Obione tetraptera Benth., Bot. Voy. Sulph. 48, 1844.
Pterochiton occidentale Torr. & Frem. in Frem., Rept. Calif. 318, 1845.
Pterochiton canescens Nutt., J. Acad. Phil. II 1:184, 1847.
Lophocarya spinosa Nutt. ex Moq. in DC., Prodr. 13(2):112, 1849.
Pterocarya spinosa Nutt. ex Moq. in DC., Prodr. 13(2):112, 1849.
Obione occidentalis Moq. in DC., Prodr. 13(2):112, 1849.
Obione beriandieri Moq. in DC., Prodr. 13(2):114, 1849.
Atriplex occidentalis (Torr.) D. Dietr., Syn. Pl. 5:537, 1852.
Obione occidentalis var. *angustifolia* Torr., U.S. Mex. Bound. Bot. 184, 1859.
Atriplex canescens var. *angustifolia* S. Wats., Proc. Am. Acad. 9:121, 1874.
Atriplex angustior Cockerell, Proc. Davenp. Acad. 9:7, 1902.
Atriplex odontoptera Rydb. Bull. Torr. Club 31:404, 1904.
Atriplex tetraptera (Benth.) Rydb., Bull. Torr. Club 39:311, 1912.
Atriplex linearis S. Wats., Proc. Am. Acad. 24:72, 1889.
Atriplex canescens var. *macilenta* Jepson, Fl. Calif. 442, 1914.
Atriplex canescens subsp. *typica* H. & C., Carnegie Inst. Wash. No. 326:343, 1923.
Atriplex canescens var. *linearis* (S. Wats.) Munz, Man. South. Calif. Bot. 141, 1935.

Fourwing saltbush

Facultative evergreen shrub, woody throughout, 4-25 dm tall, loosely to much branched forming very variable habits; stems stout, terete, gray-scurfy, old bark gray and splitting at the surface; leaves alternate, sessile or subsessile, spatulate, oblong or linear, rarely elliptic, cuneate at the base, obtuse at the apex, 1-5 cm long, 0.2-1 cm wide, entire, thick, gray scurfy, 1-nerved; plants dioecious, rarely monoecious, staminate flowers in dense spikes of glomerules in long terminal panicles, these leafy below; pistillate flowers in dense leafy and bracted spikes and panicles; staminate perianth 4- or 5-cleft, pistillate wanting; fruiting bracts sessile or short stalked, the body little compressed, united to apex, the free tips project as flat wings, 4-12 (20) mm long, conspicuously four-winged from the sides and back of the bracts, the wings entire to laciniate, the faces smooth or with small tubercles between the wings; seeds 1.5-2.5 mm long, brown; radicle superior; Alberta and South Dakota to Washington, south to Texas, California and Mexico; flowering from May to July. *A. canescens* is the most abundant and widespread species in New Mexico. It occurs in nearly all of the arid and semi-arid habitats throughout the state. *A. canescens* is a codominant in portions of the creosote desert in the south and in the Colorado Plateau shrub communities. It is a common species in many grasslands and pinyon-juniper woodlands. Scattered individuals may even be found in ponderosa pine-Douglas fir forest. The vegetation of many low elevation flood-plains and arroyos is dominated by *A. canescens* and several other shrubs or small trees. The species has a fairly wide tolerance for different levels of alkalinity and salinity, but is usually found in some form of alkaline soil. Some evidence suggests that *A. canescens*, while commonly a constituent of relatively stable plant communities, also may be an early seral species. *A. canescens* may commonly be associated with many other *Atriplex* species including *A. confertifolia*, *A. acanthocarpa*, *A. semibaccata*, *A. obovata*, *A. wrightii*, *A. elegans*, *A. powellii*, *A. saccaria*, *A. argentea*, and *A. rosea*. *Atriplex garrettii* Rydb., sometimes (Brown, 1956) treated as a variety of *A. canescens*, has been reported from New Mexico without specific locality by Brown (1956). We have examined no material of this species from New Mexico. This species differs from *A. canescens* primarily in having petioled leaves which are ovate or obovate.





5 cm

17. *A. canescens*

Specimens Examined

1. *Atriplex patula* L. subsp. *hastata* (L.) H. & C. San Juan Co.: 5 miles north of Farmington, 5,000 feet, R. Edgar s.n., 11/18/1976 (UNM); Socorro Co.: Bosque del Apache Refuge, 4,500 feet, Fleetwood, 9/13/1951 (UNM); La Joya State Game Refuge, 4,400 feet Manthey 1351, 9/3/1976 (UNM).

2. *Atriplex roseo* L. Catron Co.: Datil Mts., 7,800 feet, R. Fletcher 1241, 8/30/1976 (UNM); DeBaca Co.: Fort Sumner along Highway 70, 5,900 feet, Gordon & Dunn 900, 8/19/1949 (UNM); McKinley Co.: McKinley Coal Mine, invader of spoil-banks, 7,000 feet, W.L. Wagner 382, 8/24/1974 (UNM); San Miguel Co.: Brush Ranch, Pecos, 6,900 feet, Fleetwood, 9/05/1949 (UNM).

3. *Atriplex semiboccoto* R. Br. Dona Ana Co.: Mesilla Valley, 3,800 feet, Wooton & Standley, 5/01/1907 (NMC); Hidalgo Co.: near Animas Post Office 4,400 feet, W.L. Wagner 1868, 5/20/1975 (UNM); near Lordsburg Playa, 4,200 feet, W.L. Wagner & D. Sabo 3271, 6/20/1977 (UNM); Otero Co.: Alamagordo, 4,300 feet, Brown, 9/22/1907 (NMC); Cienga Ranch, 3,800 feet, Wooton, 6/19/1906 (NMC).

4. *Atriplex saccorio* Wats. McKinley Co.: base of Wild Berry Canyon, Navajo Site, 6,600 feet, G. Marley 101, 7/08/1976 (UNM); Junction of Highways 9 and 666 south of Tohatchi, 6,300 feet, W.L. Wagner 2460, 8/09/1976 (UNM); McKinley Coal Mine, early invader of spoil-banks, 7,000 feet, Wagner, 215 7/12/1974 (UNM) ; McKinley Coal Mine, disturbed ground, 7,000 feet, Wagner 292, 8/03/1974 (UNM); Nakaibito, sandy soil, 6,200 feet, Carter, 6/20/1935 (NMC); Navajo Site, Wild Berry Canyon, 6,650 feet, W.L.Wagner 2648, 9/11/1976 (UNM); Navajo Site, base of Wild Berry Canyon, 6,600 feet, G. Marley 200, 7/08/1976 (UNM); near Pueblo Alto, Spellenberg, Reitzel & McKinney 4333, 8/10/1976 (UNM); near Pueblo Alto, Spellenberg, Reitzel & McKinney 4159, 6/13/1976 (UNM); Rio Arriba Co.: near San Juan county line, 7,000 feet, W.L. Wagner 2372, 8/16/1976 (UNM); near San Juan county line west of Lybrook, 7,000 feet, W.L.Wagner 2371, 2373, 8/16/1976 (UNM); San Juan Co.: Chaco Canyon, 6,800 feet, Carter, 6/05/1935 (NMC) Navajo Experiment Station, Shirley, 10/19/1936; NE¼, 5,980 feet, J.T. Wynhoff 421, 9/25/1971 (ASU); Pueblo Bonito, sandy loam, 5,000 feet, Carter, 6/05/1935 (NMC).

4A. *Atriplex* orgenteo Nutt. x *A. saccorio* Wats. McKinley Co.: Navajo Site, base of Wild Berry Canyon, 6,600 feet, G. Marley, 7/08/1976 (UNM); Tohatchi, Chuska Lake, 6,400 feet, W.L. Wagner 2474, 8/19/1976 (UNM); Chaco Canyon, Pueblo Bonito, 6,500 feet, C.B. Carter 8283, 6/05/1935 (NMC); San Juan Co.: Shiprock, Carrizo Region, 6,500 feet, BEK 276, 7/1935 (NMC).

5. *Atriplex* orgenteo Nutt. subsp. orgenteo Bernalillo Co.: Albuquerque, Rio Grande Bottoms, 5,000 feet, Carter, 9/1936 (NMC); Rio Grande River, 4,850 feet, W.L. Wagner 2370, 8/15/1976 (UNM); roadsite, 5,000 feet, E.L. Castetter 3908, 6/24/1931 (UNM); Colfax Co.: Cimarron Canyon, 7,000 feet, Nelson 3924, 7/06/1935 (UNM); Dona Ana Co.: Las Cruces River Bank, Castetter 3919, 5/23/1952 (UNM); McKinley Co.: Coyote Canyon, 6,500 feet, Gardner, 9/13/1976 (NMC); Gallup, Highway 66, 6,500 feet, Dennis 7/16/1966 (NMC); Mexican Springs, 6,200 feet, Carter, 7/03/1935 (NMC); Pueblo Bonito, 5,000 feet, C.B. Carter, 8016, 6/05/1935 (NMC); Rio Arriba Co.: 30 miles east of Bloomfield, L.C. Higgins 7949, 7/27/1973 (NMC); Sandoval Co.: Jemez Mts., 7,000 feet, E.L. Castetter 3929, 9/11/1931 (UNM); "Pleistocene" lake refilled, 6,100 feet, G. Tierney 3-I-9, 6/24/1969 (UNM); San Juan Co.: Chaco Anyon National Monument 6,300 feet, Cully & Struever 32, 6/1976 (UNM); vicinity of Chaco Canyon, 6,800 feet, Castetter 3931, 7/19/1931 (UNM); Santa Fe Co.: 3.5 miles south of Galisteo, 6,200 feet, W.L. Wagner 2785, 10/05/1976 (UNM); Socorro Co.: Sevilleta, eastern foothills of Ladron, 5,800 feet, T. Manthey 427, 9/20/1975 (UNM); La Joya State Game Refuge along railroad tracks, 4,400 feet, T. Manthey 1351, 9/03/1976 (UNM); Torrance Co.: 1 mile south of Estancia, 6,100 feet, W.L. Wagner & D. Sabo 3001, 3002, 6/6/1977 (UNM); Valencia Co.: Rio San Jose, E. Wooton, 7/31/1906 (NMC).

6. *Atriplex* orgenteo Nutt. subsp. *exponsa* (Wats.) H.& C. Bernalillo Co.: Alkali flat, Albuquerque Country Club, 4,900 feet, E.L. Castetter 3930, 9/1936 (NMC); Bernalillo roadside, 4,000 feet, Castetter 6/14/1931 (UNM); Dona Ana Co.: Las Cruces along Rio Grande River, 3,800 feet, 5/23/1952 (UNM); Lower Sonoran Zone, 1,160 M, F.R. Fosberg S3652 (UNM); Mesilla Valley 3,850 feet Wooton, 10/05/1899 (NMC); Mesilla Valley, 3850 Wooton, 9/12/1906 (NMC); South of Las Cruces, along ditch, 3,850 feet, Dunn 7778, 10/05/1952 (NMC); Victoria, 4,000 feet, C.T. Bartlett, 9/28/1907 (NMC); Sandoval Co.: Jemez Mountains Biology Camp, Castetter, 8/11/1931 (UNM); Socorro Co.: Alamillo, 4,600 feet, Cockerell, 1898 (NMC); San Antonio, alkali flat, 4,600 feet, Dunn 4910, 9/17/1948 (UNM); Sevilleta Refuge, south of Highway 60 Bottomland 4,400 feet, Manthey 1187, 8/06/1976 (UNM).

7. *Atriplex powellii* Wats. Bernalillo Co.: N. of Rt. 66 along Rio Puerco, Castetter 3945, 6/26/1953 (UNM); near Rio Puerco, 5,600 feet, Castetter 3945, 6/26/1953 (UNM); McKinley Co.: Highway 66 at Gallup, 6,500 feet, Dennis, 7/16/1966 (NMC); Highway 264 on Highway 666, 6,000 feet, W.L. Wagner 2458, 2495, 8/19/1976 (UNM); McKinley Coal Mine, Common early invader of spoils, 7,000 feet, W.L. Wagner, 8/03/1974 (UNM); McKinley Coal Mine, 7,100 feet, W.L. Wagner 159, 6/15/1974 (UNM); McKinley Coal Mine, disturbed ground, 7,000 feet, W.L. Wagner 273, 274, 8/03/1974 (UNM); Mobil Site, 6,900 feet, W.L. Wagner 2964, 5/17/1977 (UNM); Navajo Site, near Coyote Canyon, 6,000 feet, W.L. Wagner 2018, 7/08/1976 (UNM); near San Juan county line, 6,000 feet, W.L. Wagner 2478, 8/19/1976 (UNM); south of Gallup 6,500 feet, Wooton 8/01/1904 (NMC) south of Gallup, Wooton 2771, 9/01/1904 (NMC); Rio Arriba Co.: Shore of Stone Lake, Casetter 3953, 6/24/1954 (UNM); Sandoval Co.: Alkali flat, vicinity of San Ysidro, 6,000 feet, Castetter 3907, 8/24/1931 (UNM); Justo tank area (sec 22, T13N,R1W), 5,740 feet, Tierney I-3-4, 6/28/1969 (UNM); San Juan Co.: Chaco Canyon, 6,500 feet, Clark 12805, 6/23/1945 (UNM); Chaco Canyon, 6,300 feet, Cully & Struever 28, 6/1976 (UNM); The Hogback, 5,500 feet, W.L. Wagner & D. Sabo 2884, 5/13/1976 (UNM); Navajo, Love, K-25, summer 1934 (NMC); northeast of Shiprock, 5,800 feet, Douglass. 10/09/1934 (UNM); near Bisiti, Spellenberg, Reitzel, and McKinney 4100, E.K. Douglass 25, 10/19/1934 (UNM); Valencia Co.: Rio San Jose 37 miles west of Albuquerque, 5,800 feet, W.L. Wagner 2999, 5/18/1977 (UNM).

8. *Atriplex elegons* (Moq.) Dietr. subsp. *elegons* Dona Ana Co.: Mesilla Valley, 3,800 feet, Wooton, 9/1900 (NMC); Mesilla Valley 3,800 feet, Wooton, 9/29/1906 (NMC); Hidalgo Co.: San Simon Valley, 4,100 feet, Moir 618, 9/1974 (NMC); Luna Co.: 3 miles south of Columbus, 4,050 feet, Castetter 10315, 8/20/1954 (UNM); 35 miles southwest of Deming, 4,100 feet, Faulkner, 8/1972 (NMC).

9. *Atriplex elegans* (Moq.) D. Dietr. subsp. *thornberi* (Jones) W.L. Wagner Hidalgo Co.: Animas Valley, 4,700 feet, W.L. Wagner 1380, 9/12/1975 (UNM); foothills near Indian Creek, 5,200 feet, W.L. Wagner 2289, 8/07/1976 (UNM); Rodeo, 4,200 feet, Cazier 420, 8/22/1976 (ASU).

10. *Atriplex wrightii* Wats. Grant Co.: Mangas Springs (18 miles Silver City), 4,800 feet Metcalfe 639, 9/04/1903 (NMC); Hidalgo Co.: Little Hatchets Mts., sandy soil, Castetter, 10310, 8/18/1954 (UNM); Luna Co.: Columbus, 4,050 feet, Castetter 9606, 9/05/1952 (UNM).

11. *Atriplex oconthocorpo* (Torr.) Wats. Dona Ana Co.: 1 mile of Rincon, volcanic soil, eroded slope, 4,100 feet, W.L. Wagner & D. Sabo 3279, 6/11/1977 (UNM); Hidalgo Co.: Lordsburg Playa, 3,800 feet, Cstetter 3937, 7/15/1938 (UNM); Lordsburg Playa, 4,200 feet, W.L. Wagner 1990, 5/23/1976 (UNM); Lordsburg Playa, 3,800 feet, Mohlhenrid, 11/27/1958 (UNM); Lordsburg Playa, 4,200 feet, W.L. Wagner & D. Sabo 3269, 3270, 6/20/1977 (UNM); Luna Co.: Cambray, 4,000 feet, Wooton, 7/03/1900 (NMC); Cambray, Providencia Lake, Wooton, 6/13/1906 (NMC).

12. *Atriplex obovoto* Moq. Dona Ana Co. 1 mile north of Rincon, volcanic soils, eroded slopes, 4,100 feet, W.L. Wagner & D. Sabo 3280, 6/11/1977 (UNM); Hidalgo Co.: vicinity of Playas Lake, 3,800 feet, Castetter, 8/21/1955 (UNM); desert near Gary exit of I-10, 4,200 feet, W.L. Wagner & D. Sabo 3265, 6/20/1977 (UNM); Big Hatchet Mts., Castatter 9927, 8/21/1955 (UNM); Luna Co.: Alkaline soil, south of Columbus, 4,050 feet, Gordon & Bochanan 129, 8/20/1954 (UNM); North of Columbus, Castetter 920, 9/05/1952 (UNM); 16 miles south of Deming, 4,300 feet, W.L. Wagner 1866, 5/20/1976 (UNM); McKinley Co.: 1 ½ miles north of Junction Highway 264 on Highway 666, 6,600 feet, W.L. Wagner 2454, 2455, 8/19/1976 (UNM); Navajo site, Dalton Pass Canyon, 7,400 feet, W.L. Wagner 1971, 5/20/1976 (UNM); 4 miles east-southeast of Star Lake Pumping Station, Spellenberg, Reitzel, & McKinney 4347, 8/11/1976 (UNM); Mexican Springs, 6,200 feet, Love, K-27 3/11/1935 (NMC); Standing Rock, 6,500 feet, Carter 7, 11/03/1935 (NMC); Sandoval Co.: 5 miles northwest of San Ysidro, 5,500 feet, W.L. Wagner 2061, 6/20/1976 (UNM); Alkali flat vicinity of San Ysidro, 6,000 feet, Castetter 3926, 8/24/1931 (UNM); San Ysidro, C.B. Carter, June 8, 1936 (NMC); San Juan Co.: Cove 6,300 feet, Klinger 281, 7/09/1935 (NMC); Farmington, 5,300 feet, Wooton, 8/08/1904 (NMC); NE of Shiprock, 5,800 feet, Douglass 22, 10/09/1934 (UNM); Chaco Canyon, W.L. Wagner 2378, 8/17/1976 (UNM); High Plains 30 miles southeast of Farmington, Klinger K-28, 6/24/1934 (NMC); Fruitland, 5,250 feet, W.L. Wagner 2481, 2486, 8/19/1976 (UNM); Chaco Canyon, 6,300 feet, Cully & Struever 54, 6/1976 (UNM); Navajo, Love Summer 1934 (NMC); Navajo Indian Reservation, Love and Klinger, 1934 summer (NMC); Navajo, Love, 1934 (NMC); Cutter Canyon, SW¼, 5,740 feet, J.T. Wynhoff KL-16, 9/15/1970 ASU); Cutter Canyon, SW¼ 5,740 feet, J.T. Wynhoff KL-5, 8/23/1970 (ASU); Chaco Canyon National Monument, 6,400 feet, Cully & Struever 01,25, 5/30/1975 (UNM); Chaco Canyon 6,300 feet, Cully & Struever 101, 8/1975 (UNM); Chaco Canyon, 6,300 feet, Cully & Struever 25, 6/1976 (UNM); Chaco Canyon, 6,300 feet, Cully & Struever 100, 8/1975 (UNM); Chaco Canyon, 6,300 feet Cully & Struever 98, 8/1975 (UNM); Torrance Co.: 2 miles north of Manzano along Highway 10, 7,000 feet, Martin 3734, 9/13/1959 (UNM); Valencia Co.: near Horace, Wooton 7/30/1906 (NMC); 3 miles east of Mesita, 5,500 feet, W.L. Wagner 2002, 6/27/1976 (UNM).

13. *Artiplex cuneota* (A. Nels.) San Juan Co.: 15 miles south of Shiprock, W.L.Wagner 2480, 8/19/1976 (UNM); High Plains 30 miles southeast of Farmington, Klinger K-28, 6/24/1934 (NMC); Kutz Canyon, 5,940 feet, J.T. Wynhoff 471, 4/24/1973 (ASU); Navajo, summer 1834 (NMC); Navajo, 1934 (NMC); Salt Creek 6 miles northeast of Shiprock, 5,400 feet Douglass 28, 10/09/1934 (NMC); sandy shale Colorado and N.Mex. border on Highway 666, 5,000 feet, Castetter 3922, 3939, 07/04/1954; 6 miles northeast of Shiprock, 5,000 feet, Douglass, 10/04/1934 (NMC); Shale vicinity Shiprock, 5,000 feet, Oakley A-53, 6/08/1934 (UNM); the Hogback, 5,500 feet, W.L. Wagner & D. Sabo 2877, 2878, 2879, 5/13/1977 (UNM); west of Blue Hill 11.5 miles north of Shiprock, 5,300 feet, W.L. Wagner & D. Sabo 2896, 2897, 2903, 5/13/1977 (UNM); Sandoval Co.: on top of Sky Village, 5,800 feet, G. Tierney, J-1-11, 6/28/1969 (UNM).

14. *Atriplex corrugato* Wats. San Juan Co.: Bisti in water Channels, Spellenberg, Reitzel, & McKinney 4104, 6/08/1976 (UNM); Colorado and New Mexico boundary on Highway 666, Castetter 3913, 7/04/1954 (UNM); 15 miles south of Shiprock, W.L. Wagner 2479, 8/19/1976 (UNM); High Plains south of Shiprock, 5,200 feet, Klinger, 6/1935 (NMC); Navajo, K-26, 1934 (NMC); northeast of Shiprock, 4,800 feet Douglass, 10/09/1934 (UNM); Rattlesnake, 5,400 feet, Clark, 4/26/1947 (UNM); Shiprock, 5,800 feet, Shirley, 4/12/1937 (NMC); Shiprock, 5,800 feet, J.J.T. 1934 (NMC); west of Blue Hill, 11.5 miles north of Shiprock, 5,300 feet, W.L. Wagner & D. Sabo 2902, 5/13/1977 (UNM).

15. *Atriplex griffithsii* Standl. Hidalgo Co.: Lordsburg Playa, 4,200 feet, W.L. Wagner & D. Sabo 3266, 3267, 6/20/1977 (UNM); Lordsburg Playa, 4,200 feet, Hershey, 10/05/1944 (UNM) Luna Co.: 3 miles east of Deming, 4,300 feet, Branson, 10/17/1966 (UNM).

16. *Atriplex confertifollo* (Torr. & Frem.) Wats. McKinley Co.: McKinley Coal Mine, 7,000 feet, W.L. Wagner 230, 7/13/1974 (UNM); Navajo site, 6,600 feet, W L. Wagner 2408, 8/17/1976 (UNM); Navajo Site, Blackwater Canyon 6,750 feet, W.L. Wagner 2773, 4/22/1977 (UNM); Rio Arriba Co.: near San Juan county line, W.L. Wagner 2374, 8/16/1976 (UNM); Sandoval Co.: Torreon, heavily grazed, eroded, 6,000 feet, Carter, 6/05/1935 (NMC); Sandoval Co.: west of Cuba, 7,000 feet, Hershey, 5/31/1940 (NMC); San Juan Co.: Chaco Canyon National Mon., 6,300 feet, Cully & Struever 99, 108, 8/1975 (UNM); Cove, B.S.K. 283, 7/1935 (NMC); Cutter Canyon 5,760 feet, J.T. Wynhoff KL-20, 5/30/1970 (ASU); Fruitland, 5,400 feet, Castetter 3933, 6/08/1953 (UNM); The Hogback, 5,500 feet, W.L. Wagner & D. Sabo 2882, 2883, 5/13/1976 (UNM); Navajo, summer 1934, New Mexico and Colorado boundary, Castetter 3939, 7/04/1954 (UNM); Rattlesnake, New Mexico, E. Castetter 3921, 7/04/1954 (UNM); Saltcreek (NE of Shiprock); Douglass A225, 10/09/1934 (UNM); west of Waterflow, 5,400 feet, Harris, 8/16/1960 (UNM); ½ mile from Navajo Bridge, Gardner, 4/18/1937; Socorro Co.: eastern foothills of Ladron Peak, 5,400 feet, T. Manthey A118, 8/30/1974 (UNM) Sevilleta, 5,400 feet, T. Manthey 415, 9/20/1975 (UNM).

17. *Atriplex canescens* (Pursh) Nutt. Bernalillo Co.: Albuquerque, 5,100 feet, Castetter 3925, 5/28/1930 (UNM); Albuquerque, 5,000 feet, Carter 4/16/1936 (NMC); Albuquerque, 5,000 feet, Carter 8/01/1936 (NMC); Albuquerque, in mesa, 5,100 feet, Castetter 3925, 5/25/1930 (UNM); Albuquerque on Yale SE, 5,000 feet, W.L. Wagner 2601, 5/20/1976 (UNM); Cedro Canyon 7,000 feet, N. Pattison 143, 8/24/1966 (UNM); Juan Tabo Canyon, 6,600 feet, Repetto 17, 10/01/1966 (UNM); Juan Tabo Canyon, 7,000 feet, T.P. Boyle 352, 9/30/1967 (UNM); lower Juan Tabo Canyon, 6,400 feet, D.T. Jennings 9/26/1964 (UNM); Mesa along San Club Road, Dittmer & Castetter 3928, 6/5/1952 (UNM); 19 miles west of Albuquerque, Rio Puerco, 5,250 feet, W.L. Wagner 1996, 6/27/1976 (UNM); N. Mex. Highway 422 & New Mex. Highway 44 on 422, C.K. Dixon A-194, 7/29/1961 (UNM); Otero Canyon, Manzano Mts., 6,900 feet, D.M. Boyd 69, 10/14/1961 (UNM); Catron Co.: Datil Mts., 7,600 feet, K. Goodrow 1122, 8/09/1963 (UNM); San Augustine Plains, Wooton 2763, 7/22/1904 (UNM); San Augustine Plains, J.S. Findley 133, 8/14/1958 (UNM); San Augustine, Castetter 2763, 8/06/1952 (UNM); Chaves Co.: Bitter Lakes, Castetter, 8/18/1952 (UNM); Elkins, 4,000 feet, Castetter, 4/24/1952 (UNM); Roswell, 3,800 feet, Earle & Earle, 8/1900 (NMC); Roswell, 3,800 feet, Cockerell, 8/28/1902 (NMC); Dona Ana Co.: Coronado State Monument, D.J. Pinkava, 9/02/1961 (ASU); Las Cruces, 3,800 feet, Wooton, 5/17/1893 (NMC); lower Sonoran Zone, 116. m, R. Fosberg S3290 7/26/1930 (UNM); Mesa west of Organ Mts., Little Mt., 4,400 feet, Wooton, 4/28/1892 (NMC); Mesilla, 3,800 feet, Wooton, 6/22/1897 (NMC); Mesilla Valley, 3,800 feet, Wooton, 6/15/1907 (NMC); Mesilla Valley, 3,850 feet, Wooton, 6/14/1908 (NMC); Mesilla Valley, 3,850 feet, Wooton 10/02/1899 (NMC); Mesilla Valley, on sand hills, 3,850 feet, Wooton, 5/18/1899 (NMC); San Andres Mountains, 6,000 feet, Dunn, 5/24/1954 (NMC); San Andres Mountains, 6,100 feet, Von Loh 396, 7/01/1975 (UNM); 20.3 miles west of Las Cruces, Pinkava, Keil, Lehto 13189, 6/20/1968, (ASU); Victorio, 4,000 feet Bartlett, 9/28/1909 (NMC); White Sands National Monument, 4,000 feet, Wooton, 8/18/1907 (NMC); White Sands National Monument, 3,900 feet, Wooton 6/19/1899 (NMC); Eddy Co.: Guadalupe Mts., 5,500 feet, J.S. Tukier 2-10, 8/31/1962 (UNM) Guadalupe Mts., Walnut Canyon 3,800 feet, 14, 10/01/1955 Gaudalupe Co.: north of Santa Rosa along Pecos River, L.C. Higgins 8961, 7/07/1974 (ASU); Santa Rosa, 4,600 feet, Castetter 3915, 7/16/1954 (UNM); Hidalgo Co.: Big Hatchet Mts. 4,500 feet Castetter 7613, 5/13/1955 (UNM); Big Hatchet Mts., J. Findley 8366, 5/10/1958 (UNM); Lordsburg Playa, 3,800 feet, Nielson 107, 7/15/1938 (UNM); Lea Co.: 25 miles west of Hobbs 6/05/1952 (UNM); West of Hobbs, 3,600 feet 6/05/1952 (UNM); Lincoln Co.: Capitan (Gray), 6,500 feet, Skehan, 7/28/1898 (NMC); Carrizozo.: Lava Beds, W.C. Martin 3133, 5/24/1959 (UNM); 14 miles south of Carrizozo, 5,100 feet, B. Hutchins 3444, 5/29/1971 (UNM); lava flow 5 miles northwest of Carrizozo, 5,280 feet, B. Hutchins 774, 9/01/1965 (UNM); Nogal, 6,800 feet Gordon & Dunn 729, 8/17/1949 (UNM); Rio Hondo Valley locale, 5,500 feet, J.Kimmons 1, 6/09/1968 (UNM); Three Rivers Campground, Hutchins 3108, 7/03/1970 (UNM); Tularosa Valley, north of Tularosa 4,400 feet, Wooton & Standley, 8/19/1907 (NMC); Luna Co.: south of Deming, 4,300 feet, Evans 7/1891 (NMC); south of Deming, 4,300 feet, W.L. Wagner 1865, 5/20/1976 (UNM); McKinley Co.: Dalton Pass, Navajo Property, R. Powell 48, 7/09/1976 UNM; Fort Wingate, 6,500 feet Carter, 8/07/ 1936 (NMC); Gallup, 6,500 feet, Herrick, 7/20/1897 (NMC); McKinley Coal Mine, 7,100 feet, Wagner 7100, 6/15/1974 (UNM); Nakaibito, slope 6,600 feet, Carter, 6/09/1935 (NMC); Nakaibito, 6,602 feet Klinger, summer 1934 (NMC); Nakaibito Area, 6,400 feet, B. Klinger 6-232, 6/11/1935 (UNM); Navajo Site Dalton Pass Canyon, 6,800 feet, W.L. Wagner 2041, 7/09/1976 (UNM); Six Mile Canyon, N. Jackson 11, 10/05/1962 (UNM); Otero Co.: Alamo Mt. in New Mexico, 6,800 feet, A.H. Harris, 4/18/1962 (UNM); south of Alamogordo, 4,300 feet, 8/30/1952 (UNM); White Sands National Monument, 4,000 feet, Bell 3936, 5/24/1939 (UNM); Rio Arriba Co.: El Rito, 7,200 feet, Miller 259, 8/1962 (UNM); Ghost Ranch Arch. Digsan Pedro Mts., L. Housely 911, 7/24/1976 (UNM); near Espanola, 5,100 feet, H. Bobisud 65, 9/27/1964 (UNM); near San Juan county line, W.L. Wagner 2375, 9/10/1976 (UNM); San Juan Co.: Armenta Canyon, J.T. Wynhoff 518, 8/20/1973 (ASU); Aztec, 5,600 feet, Griffiths, 7/01/1885 (NMC); Chaco Canyon National Monument, 6,800 feet, O.M. Clark 12799, 6/17/1945 (UNM); Chaco Canyon National Monument, 6,400 feet, Cully & Struever 93, 8/1975 (UNM); Mexican Springs, 6,200 feet Klinger, 3/12/1935 (NMC); near Fruitland, 5,400 feet, Castetter 3933, 6/08/1953 (UNM); northeast of Newcomb, 5,600 feet, Harris, 7/17/1963 (UNM); 2 ½ miles north and ¼ miles east of Waterflow, A.H. Harris (UNM); San Miguel Co.: Conchas Dam, 4,000 feet, F. Broeske 218, 5/1965 (UNM) Las Vegas, 6,400 feet, Williams, 9/22/1954 (UNM); Sandoval Co.: Bandelier National Mon., 6,200 feet, Yarnell 116, 8/22/1957 (UNM); Jemez Biol. Camp., Jemez Mts., 7,000 feet, Castetter 3911, 8/17/1931 (UNM); J. Naylor 129, 7/03/1964 (UNM); Sky Village Valley, 5,800 feet, Tierney J-1-7, 6/08/1969 (UNM); Santa Fe Co.: Arroyo Hondo, 7,100 feet, Kelley 307, 9/1972 (UNM); one mile north of Moriarty, 6,200 feet, W.L. Wagner 2735, 10/05/1976 (UNM); Santa Fe Municipal Airport, J.W. McKinley 31, 8/04/1953 (UNM); Sierra Co.: northern end of San Andres Mts., Findley, 11/21/1958 (UNM); south end of Black Range, Animas Creek, 5,000 feet, Metcalfe, 7/13/1904 (NMC); Socorro Co.: Chupadera Mesa, 6,500 feet, Dunn & Lint 4395, 4419, 8/15/1948 (UNM); Cibola National Forest, Dunn & Lint 5032, 9/28/1948 (UNM); Cibola Forest, Chupadera Mesa, Dunn & Lint 4467, 8/16/1948 (UNM); Cibola Forest Chupadera Mesa, 6,500 feet, Dunn & Lint 4466, 8/16/1948 (UNM); Crater, Dunn & Lint, 4636 (UNM); east side of Magdalena Mts. 6,150 feet, B. Huchins 4254, 6/30/1976 (UNM); 11 miles south and 1 mile west of Magdalena, 7,500 feet, Potter 26, 10/10/1955 (UNM); foothills Magdalena Mts., 6,200 feet, Hutchins, 6/30/1973 (UNM); Harvey Gate(?), Dunn & Lint 5069, 9/28/1948 (UNM); Lopezville (NW of Socorro), Dunn & Lint 4871, 9/28/1948 (UNM); near Stallion Site in U.S. 380, Findley & Jones, 9/19/1961 (UNM); near Claunch, D. Dunn 5181, 10/06/1948; northside of north Oscuro Peak, 6,700 feet, Dunn & Lint 4099, 7/31/1948 (UNM); Oscuro Peak, 5,000 feet, Dunn & Lint 4044, 7/25/1948 (UNM); Socorro 4,600 feet, Herrick, 9/05/ 1895 (NMC); Socorro, Rio Grande, 4,600 feet, O.M. Clark 4332, 8/12/1931 (UNM); south of Bear Springs, Castetter & Dittmer 3018, 6/25/1949 (UNM); two miles south of Bernardo, 5,000 feet, Baca 174, 8/16/1965 (UNM); Taos Co.: Tres Piedras, 8,200 feet, McKenzie 57, 9/1968 (UNM); Torrance Co.: Manzano Mts., 7,800 feet, Bedker 1506, 9/01/1963 (UNM); Union Co.: Folsom, 6,800 feet, Castetter & Dittmer 3927, 6/21/1951 (UNM); Valencia Co.: City limits of Belen, 4,800 feet, O. Baca 19, 9/20/ 1964 (UNM); El Morro, 7,000 feet, Castetter 3914 8/31/1954 (UNM). Hernandes Ranch, Mt. Taylor, 7,800 feet, Castetter 1830, 7/09/1932 (UNM); Lobo Canyon, Mt. Taylor N. Osborn, 6/27/1960 (UNM); Lobo Canyon, Mt. Taylor, Osborn 200, 6/27/1960 (UNM); Los Lunas Swamps, 5,000 feet, M. Cogswell 169, 10/15/1965 (UNM); 1 mile north of Los Lunas, Walton 67, 10/05/1963 (UNM); Zuni Mountain 7,500 feet, Riffle 323, 6/27/1968 (UNM); Zuni Mts., 7,500 feet, Riffle, 7/19/1968 (UNM); Zuni Mts., Zuni Canyon, 7,500 feet, J.L. Riffle 565, 7/19/1968 (UNM).

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